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STEEL

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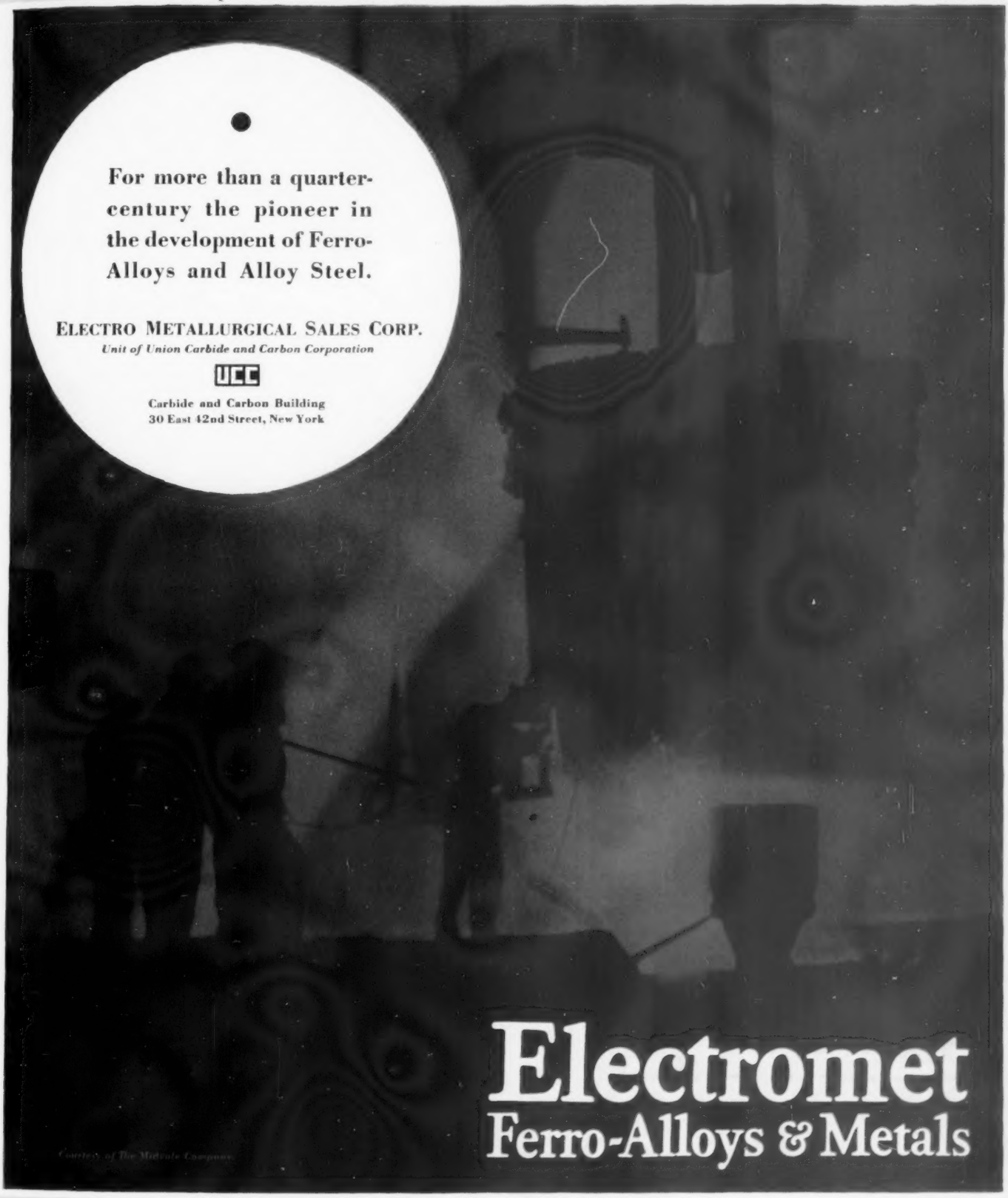
For forty-eight years—IRON TRADE REVIEW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STEEL

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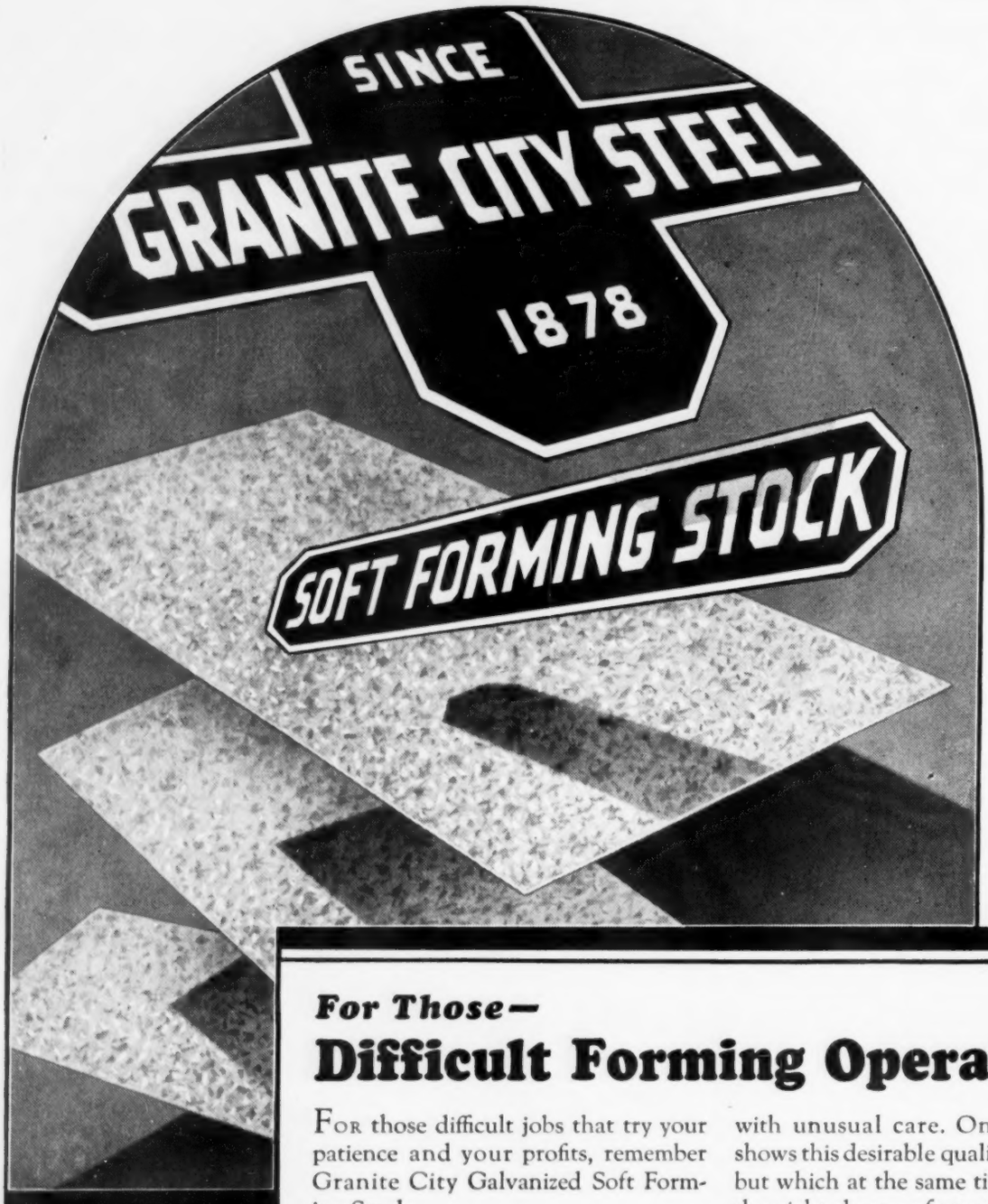

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Volume 91 Number 25

STEEL

For forty-eight Years—IRON TRADE REVIEW

PRODUCTION • PROCESSING • DISTRIBUTION • USE

The Week in Perspective

CLOSE to 100,000 restyled, streamlined automobiles are rolling off assembly lines this month—largest production since July and further evidence that the automotive industry, fortunate enough to contact the ultimate consumer directly, is unsparing in courage and ingenuity to tempt dormant dollars (p. 15). This encouraging December output, spurred by the forthcoming shows, is largely without the support of Ford, and since this maker is tooling up for a vigorous campaign next month and Chevrolet, now the premier producer, is specifying as heavily for January as for December, the automotive industry may get away to a good start in 1933, considering the times. Steel's best customer thus may supply a needed fillip to the market early in January.

From Auto to Charging Box in One Minute

Only a few of the larger manufacturers, even under pressure, can drop new cars off their lines at the rate of one a minute, but at the end of a disassembly line in Detroit is a hydraulic press (p. 24) capable of taking junk cars, stripped of salvable material, at that rate and under 1000 tons pressure reducing them to bales for charging into the open hearth. . . . To move material more cheaply to automotive consumers, lower freight rates on finished steel from Pittsburgh and Youngstown to Detroit will be considered (p. 11) at a hearing Dec. 22. . . . Such adjustment, likely to affect all Detroit rates, might conflict with the recommendation (p. 13) to the interstate commerce commission that railroad freight surcharges be extended beyond March 31.

Defaults Stiffen Stand on Imports

An already-bellicose attitude at Washington on the import situation may easily be intensified by the Dec. 15 defaults on war debt payments. Tending to interpose more obstructions to imports (p. 13), the customs bureau has expanded the list of iron and steel products which must be individually marked with the country of origin, the tariff commission has called a hearing Jan. 20 on the proposal of President Hoover to consider valuations for import purposes in the light of depreciation of foreign currencies, the commissioner of customs has informed a congressional committee that receipts from countries which have debased their currencies will increase.

Rails, Pipe, Tanks Cover Market Retreat

While domestic iron and steel markets ease into the holiday lull, favorable factors are not entirely lacking (p. 43). More rail, cast pipe and tank business is developing, the latter including brewery business contingent upon congressional action. . . . Abroad the markets

Griscom Bettle, official of Edward G. Budd Mfg. Co., Philadelphia, is pointing to solid metal ring inside pneumatic tire of coach built by Budd for the Reading railroad, preventing collapse of over 3/8-inch in case of puncture

also have their encouraging aspects, especially in the Middlesbrough district of England (p. 57). The French are more active in the export market. If sales comptoirs can be set up (p. 12), the international steel cartel may be revived. . . . A domestic move which is logical and constructive is the Steel corporation's consolidation (p. 11) of its Carnegie and Illinois Scully warehouses.

Stainless Steel Goes to Sea

On a voyage to Australia, an English ship is testing (p. 34) the practicability of using stainless steel, over 70 parts of the vessel and equipment, from hull plates to tableware, being of this alloy. . . .An eastern shipyard, which also welds pressure vessels, plate work and special machinery, recently installed, among other improvements, a stress-relieving furnace, X-ray inspection outfit and special work-handling devices (p. 21). The furnace, which is exceptionally large, can also anneal large steel castings and welded assemblies. . . .Bethlehem's shipbuilding subsidiary is low (p. 46) on the largest pending naval work, a cruiser requiring 7300 tons of steel.

Inch to Equal 25.4 Millimeters the World Over

That 1 inch equal 25.4 millimeters as the American standard for converting inches to millimeters is the recommendation of an industrial conference interested in precise measurements and methods of limit gaging (p. 32). This being the basis of value in Great Britain and advocated on the Continent, world uniformity appears near. . . .Speaking of figures, the coefficient of thermal expansion of a new type of refractory (p. 37) is 0.0000027, its value for high-temperature application being obvious. . . .A new type of neutral-basic refractory, which reacts only slightly if at all with basic slags or metallic oxides and may be insulated effectively, has possibilities (p. 26) as open-hearth roof material.

Sulphurized Oils an Aid to Cutting

Use of sulphurized oils as cutting fluids when drilling steel and hard alloys gives lower torque values than do other cutting fluids, according to tests reported to the A.S.M.E. recently (p. 31). Correct grinding methods, it is claimed, will save up to 25 per cent of the investment in cemented carbide cutting tools . . . .A heavy duty cutting steel in which molybdenum replaces tungsten to a large extent has been developed (p. 37) by a Pittsburgh district steelmaker. . . .In steelworks as in metal working plants, tests show (p. 32) white to be the most efficient color as an aid to lighting, with yellow, green and gray next in order.

The VOICE of INDUSTRY

Communications appearing here do not necessarily reflect the opinion of STEEL *or of its editors.*

Has Tariff Policy Intensified Depression?

To the Editor:

During the past few years we have so greatly increased our tariffs that almost every nation in the world has legislated against us in this respect. Even Great Britain, the mother of free trade for 100 years, has imposed heavy tariffs and negotiated preferences with the other members of her commonwealth, all to our disadvantage.

I can remember when almost all low-priced cars in Britain were of American make. In 1929, however, I saw few of our manufacture. I venture to remark that but for our heavy tariffs we should never have reached the present depths of this depression, and in support of that statement, point out that an export business that amounts to 10 per cent of normal is very important when our domestic demand is 20 per cent or less of normal.

I believe our tariff policy to be appreciably wrong. It has led us to attempt trade agreements that make us appear foolish.

S. H. DAVIES

Chicago.

Do You Believe That "American" Ends With "I Can"?

To Brokers, Distributors, Consumers:

Are *you* an American? . . . Do you realize that the problem of opening up our present idle industries is up to you?

You can help cure the sores of this country's surplus goods by thinking, acting,—in behalf of your own country—America. The time has come when all of us must stop, look and listen, and think of America and American products.

How? By buying American-made goods. . . . In these difficult times, without thinking just where we are drifting, the pocketbook of Americans have been opened in an unpatriotic spirit in purchasing foreign made goods—goods on which foreign manufacturers enjoy some prosperity at the expense of Americans.

Steel, nails, wire-fencing, rugs, cotton products, toys, machinery, lumber, tools, shoes, paper, oils, etc., are sold in increasing volume* in this country and yet we wonder what is the matter with the country!

Demand American-made goods; refuse to buy any product not made in America.

Do you believe that "American" ends with "I can"? You don't if you buy foreign-made goods. Don't sell America short!

Riverside Mills,

THOS. M. ANDERSON,
Sales Manager.

Augusta, Ga.

---

*To show the trend of imports, we present the value of merchandise imported into the United States during 1932 to date:

Jan.	$135,520,000	June	$110,200,000
Feb.	130,978,000	July	79,420,000
March	131,189,000	Aug.	91,100,000
April	126,522,000	Sept.	98,448,000
May	112,276,000	Oct.	106,000,000

It must be remembered that under today's price situation, dollar values are not a reliable index of volume.

THE EDITORS

Carnegie Warehouses Pass to Illinois Scully, Under Heggie

ILLINOIS SCULLY STEEL WAREHOUSE CO., Chicago, in January will absorb the warehouse business of the Carnegie Steel Co., Pittsburgh, as a further development in a realignment of activities of the United States Steel Corp., of which both are subsidiaries.

The name of the Illinois Scully company probably will be changed, the better to identify it with the Steel corporation.

Charles Heggie, who became president of the Illinois Scully company Nov. 1, 1931, when the Scully Steel & Iron Co. and Illinois Steel Warehouse Co. were consolidated, will be president of the new company, probably with headquarters in Pittsburgh. He was formerly president of the Scully company.

Are Strategically Located

Warehouses are now conducted by the Carnegie company in Pittsburgh, Cleveland, Baltimore, Boston, Waverly, N. J., and Houston, Tex. Illinois Scully warehouses are located in Chicago, St. Louis and St. Paul.

From the Carnegie warehouses are jobbed chiefly the products of the Carnegie company, including shapes, bars, plates, and flats, but also including sheets.

The Illinois Scully warehouses have been carrying a wide variety of steel products, including not only the above but also chains, welding electrodes, staybolts, chain hoists, rivet sets, track material and practically all lines usually handled by a general warehousing interest.

Whether the stocks of the present Carnegie warehouses are to be expanded to include the general warehouse lines has not been stated.

Taylor's Formal Statement

The formal announcement of the consolidation was made in New York, Dec. 15, by Myron C. Taylor, chairman of the board, as follows:

> The United States Steel Corp. has concluded to consolidate its warehousing or steel jobbing business, now conducted by the Illinois Scully Steel Warehouse Co., by transferring to it similar operations now conducted by Carnegie Steel Co.
>
> The name of the Illinois Scully Steel Warehouse Co. will probably be changed to indicate more clearly its relation to the United States Steel Corp.
>
> The change indicated will be effected not later than Jan. 31, 1933. Charles Heggie, now president of Illinois Scully Steel Warehouse Co., will continue as president of the enlarged company.

There is no statement whether the new setup will affect other warehouses of Steel corporation subsidiaries, such as those operated by the American Steel & Wire Co.

Would Junk Plants To Reduce Taxes

WHERE there is no reasonable hope for their future need, idle plant and equipment should be written off to reduce state and county taxes, state franchise taxes, insurance premiums and future depreciation charges, Robert E. Belt, secretary, recommended at the annual meeting of the Malleable Iron Research institute, in Cleveland, Dec. 14.

R. E. Sommer, of Deahl & Sommer, Cleveland, recommended a trade conference agreement not to sell below cost, and compilation of current market information by an individual agency as means of stabilizing prizes. T. M. Harrison, of Stevenson, Jordan & Harrison, presented a paper on time-setting by analysis of individual elements.

E. E. Griest, Chicago Railway Equipment Co., president of the institute, reviewed accomplishments of the past year and announced a program. The following officers were elected: President, Mr. Griest; vice president, S. E. Doster, Superior Steel & Malleable Castings Co., Benton Harbor, Mich., and F. O. Parker, Acme Steel & Malleable Iron Works Inc., Buffalo; secretary, Mr. Belt.

B. O. Thomas, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich., F. S. O'Neil, Link-Belt Co., Indianapolis, and O. J. Cesna, Albion Malleable Iron Co., Albion, Mich., were elected directors.

May Cut Rates to Detroit

A hearing will be held at Pittsburgh, Dec. 22, on proposals of steel manufacturers in the Pittsburgh and Youngstown, O., districts to reduce railroad freight rates to Detroit. A suggested rate on finished steel from Pittsburgh to Detroit is 20 cents per 100 pounds, compared with a present rate, including surcharge, of 28½ cents. A reduction from Youngstown to Detroit from 25 cents to 15 also has been proposed. An adjustment in these rates would probably carry with it rates from Cleveland, Chicago, Buffalo, Wheeling and Weirton, W. Va., and Middletown and Mansfield, O.

Steel Plant for Phoenix

Consolidated Steel Pipe & Tank Co., of which Franklin Hageman, for 20 years with the United States Steel Corp., is president, plans to start operations March 1 at Phoenix, Ariz. Alfred Johnson, for four years manager of the Arizona Steel Pipe & Tank Co., is vice president and manager.

Equipped with an electric overhead

MOVING LAKE BOTTOM FOR SEWAGE DISPOSAL PLANT: Tractors employed to haul 490,000 cubic yards at new easterly disposal plant at Cleveland worked up to their fenders in mud and water, at times. Photo courtesy of Caterpillar Tractor Co., Peoria, Ill.

crane, the first building will be 80 x 100 feet, costing $65,000 for construction and machinery.

Pittsburgh Forge & Iron Co. Plant To Be Dismantled

United Iron & Metal Co., iron and steel scrap broker, Pittsburgh, has purchased the plant of the Pittsburgh Forge & Iron Co., North Side, Pittsburgh, for dismantling. About 7000 tons of iron and steel scrap are estimated to be in the old works, not operated for several years. The plant was built in 1864 and has 29 single puddling furnaces, one squeezer, 21 heating furnaces, a 16-inch three-high bar mill and a 20-inch two-stand muck bar mill. The company used to make muck and scrap bar, spike and bolt rods, screw spikes, heavy marine and machine forgings and railroad parts as well as a small tonnage of merchant bars. It was one of the oldest rolling mills in the country.

Sales Comptoirs Condition For Reviving Steel Cartel

Although no definite agreements have been made for the renewal of the International Steel Cartel, discussions looking toward reconstitution continue to be held frequently, according to the commerce department's iron and steel division.

Disagreements among Belgian iron and steel producers, hitherto the main obstacle to renewal, are reported to have been adjusted, it was stated.

There is a vigorous and growing demand for the creation of international sales comptoirs, or cartels, as a condition to the re-establishment of the steel cartel, it was reported. These sales cartels would be the sole selling agents and would subdivide among the different national groups the export trade, leaving to each national group its own domestic market.

Seasonal Decline Curbs Tin, Terne Plate Output

Production of tin and terne plate in the United States declined to 82,000 tons in November from 88,000 tons in October and a similar tonnage in November, 1931, according to the American Bureau of Metal Statistics. The decline was seasonal.

Latest available statistics for Great Britain show that country produced 56,900 tons in September, compared with 43,300 tons in August and 60,000 tons in September, 1931. German production increased to 13,781 tons in October from 10,688 tons in September and 9875 tons in October, 1931.

Exports of tin and terne plate from the United States declined to 3659 tons in October from 5100 tons in the preceding month and 6138 in October of 1931. British exports, on the contrary, jumped to 40,161 tons in October from 26,458 tons in the preceding month and were well ahead of the October, 1931, total of 36,717 tons. Germany increased its exports to 5399 tons in October from 4569 tons in September. The October, 1931, total was 5779 tons.

Ohio Employers Oppose Unemployment Insurance

Ohio employers are vigorously opposing the bill to be introduced in the state assembly in January to establish a system of compulsory unemployment insurance. A similar bill was defeated at the last session.

James F. Lincoln, president, Lincoln Electric Co., Cleveland, will discuss the subject before the annual meeting of the Associated Industries of Cleveland, in Cleveland, Jan. 10. Mr. Lincoln is vice chairman of the commission appointed by Governor White last year to study the problem.

The association has issued a bulletin in which it states the commission was "packed" with advocates, and that a report in favor of such a bill was "as expected." Mr. Lincoln condemned the measure, and was joined by Walter F. Kirk, master of the Ohio grange.

October Crane Orders Fail To Show Increase

New York—Shipments of and new orders for electric cranes declined in October, according to the monthly report of the Electric Overhead Crane institute.

October shipments included five units with a tonnage capacity of 105 valued at $42,032. This compares with six cranes shipped in September with a tonnage capacity of 161, valued at $61,282.

New orders dropped to six units with a tonnage capacity of 80, valued at $30,555. New orders the previous month included eight cranes, tonnage capacity 324, valued at $66,737.

Unfilled orders Nov. 1 included 23 cranes with a tonnage capacity of 920, valued at $222,181. On Oct. 1 there were 27 units on order with a tonnage capacity of 1081, valued at $413,564.

Rock Island Arsenal Buys

Crucible Steel Co. of America, Pittsburgh, has booked 10,371 pounds of cold-rolled strip for the Rock Island, Ill., arsenal at 5.75c, delivered. Michigan Seamless Tube Co., Detroit, has booked 1400 feet of seamless steel tubing for the Rock Island arsenal at 10.51c a foot.

November Employment In Metal Trades Unchanged

Metal trades employment in November practically was unchanged from that of the preceding months, according to the monthly report of the National Metal Trades association, Chicago. The November index was 50.2, taking the 1925-1927 average as 100, compared with 50.4 in October and 49.6 in July, the lowest month of the year. A year ago the index stood at 64 and had declined steadily since July.

Metal trades earnings have tended upward since August, the October index being 50.4 against 46.6 two months previous. Only slight changes were recorded last month in metal trades employment at leading centers.

Navy Buys Forgings for Eastern and Western Yards

Midvale Co., Philadelphia, has been awarded a contract for nickel steel forgings for the navy, eastern yards, at $52,961.11, delivered. The Titusville Forge Division took nickel steel forgings for Puget Sound, bidding $12,744.95 f.o.b. works. Bids were opened Nov. 5.

Erie Forge Co., Erie, Pa., has booked steel forgings for eastern yards at $61,409.52, delivered. Steel forgings have also been awarded the Carnegie Steel Co., Pittsburgh, at $3121.21 and Titusville Forge Division at $14,627.80, the two latter contracts being for Puget Sound but placed f.o.b. works.

Steel Accident Frequency Reduced; Awards Listed

In 208 units which entered the metals' section safety contest, under auspices of the National Safety council, for the period Jan. 1 to June 30, 1932, the average accident frequency rate was 9.194, a reduction of 17 per cent from the average rate in 1931; a decrease of 41 per cent from 1930, and of 38 per cent from 1929. The units entering the contest were divided into groups, the winner in each group receiving a trophy. These winners were: Steel mills division, Group A—Corrigan, McKinney Steel Co., Cleveland; Group B—The Midvale Co., Philadelphia; Group C—Republic Steel Corp.'s South Chicago plant.

Rolling, finishing and fabricating division, Group A—American Rolling Mill Co.'s Zanesville, O., works; Group

B—Great Lakes Forge Co., Chicago.

Iron foundries, Group A and B—National Radiator Corp.'s New Castle, Pa., plant. Steel foundries, Group A and B—Hayes Stellite Co., Kokomo, Ind. Heavy machine shops, Group A—Lycoming Mfg. Co.'s plant No. 1 at Williamsport, Pa.; Group B—United States Rubber Co.'s shoe hardware plant, Waterbury, Conn.

A large number of additional plants received certificates for exceptional safety records.

River-Rail Coal Moving

Over 5000 tons of coal per week is being moved into Youngstown, O., via the new river-rail route from Nemacolin, Pa., to Colona, Pa., on the Ohio river, for reshipment at the latter point via Pittsburgh & Lake Erie railroad. In about another month the coal will be reshipped at Conway, Pa., to be transported by rail on the Pennsylvania railroad lines into Youngstown.

Arsenal Buys Strip, Bars

For the Picatinny Arsenal, N. J., the Factory & Yard Supply Co., New York, has been awarded 260 lengths of drill rod at 23.5c. Hill-Chase & Co., Philadelphia, booked 1900 feet carbon steel strip at 4.72c a pound. Greene-Wolf Co., New York, took 30,000 pounds carbon steel bars at 2.81c and 1260 feet at 3.81c a pound. Bids were taken Nov. 21, and prices are for delivery.

Books Tanks for Beer

Buffalo Tank Corp., Lackawanna, N. Y., will manufacture storage tankage and equipment, costing over $40,000, for the American Brewing Co., Rochester, N. Y. The tanks will be coated on the inside by Henry Gusmer & Co., New York. Several hundred tons of steel will be required for the job, believed to be the first noteworthy contract in anticipation of the return of beer.

"Worst Is Over"-Robertson

"It is now safe to plan for the future, the worst of the depression is behind us and better times are slowly and steadily coming," said A. W. Robertson, chairman, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in a recent address at Boston.

India, Japan Ship Iron In

Imports received at Philadelphia during the week ending Dec. 10 included 414 tons of pig iron from British India and 98 tons pig iron from Japan.

Debt Haggling May Aid Fight On Imports; Washington News

WASHINGTON—There is no suggestion that the various proposals to check imports will be used as punitive measures against Europe on account of the feeling created by the default of some countries on their war debt payments due Dec. 15, and the grudging payments by other countries, but undeniably the case of American manufacturers seeking additional protection has received sentimental assistance. The temper of official Washington is much more sympathetic toward utilizing every possible means in the tariff and revenue laws to protect home industry.

Sanction President's Request

After considerable delay, the request of President Hoover, made prior to the election, that the method of valuing imports for tariff purposes be reconsidered in the light of depreciation of foreign currencies, has won favorable action from the tariff commission. A hearing on this matter has been ordered for Jan. 20.

In a timely appearance before a congressional committee, F. X. A. Eble, commissioner of customs, has stated that "imports from countries that have debased their currency will tend to increase and at very low prices." Captain Eble stated that imports of Germany and France, which remain on the gold standard, from the United States will tend to become relatively smaller than their exports to the United States. He gave it as his opinion that United States exports will probably continue to decline unless something is done to correct the situation in those countries which have abandoned the gold standard.

Even Lacings Must Be Marked

The customs bureau has held that steel belt lacings, certain sprocket chains, and pipe fittings such as tees, elbows, and unions, are required to be marked individually with the country of origin when they come into the United States.

The bureau found that articles of this nature (with the exception of the smaller sprocket chains) are capable of being marked to indicate the country of origin and are required to be so marked. In this connection the bureau states further:

"So far as this decision involves a change of practice at any port, it will only be applied to steel belt lacings, sprocket chains, and pipe fittings which are imported after a period of 90 days following the publication of the abstract of this decision."

Seeks Surcharge Extension

American Railway association has filed a petition with the interstate commerce commission asking an extension after March 31, 1933, of the surcharges on freight rates made effective last Jan. 4. The carriers also ask that the pool plan of distributing revenue, resulting from these surcharges, be eliminated.

Last January it was estimated that the surcharges would yield $100,000,000 to $125,000,000 annually, but because of the decrease in traffic this year only $60,000,000 will accrue.

The interstate commerce commission in a report to congress Dec. 13 said that application of the 6-hour day to the railroads would not adversely affect their operations and service. However, on the basis of 1930 traffic, and provided no reductions were made in the then existing rates of pay for eight hours, the increase in railroad operating expenses would be $630,000,000 a year.

R. F. C. Buys More Bonds

Reconstruction Finance Corp. has agreed to purchase $3,250,000 worth of bonds from San Diego, Calif., to be used for completing the El Capitan dam. In this project, 15,000 tons of cast iron pipe, or its equivalent of steel pipe, will be required. Other R. F. C. loans or approvals include:

To the Tybee Waterworks, Savannah Beach, Ga., $22,000 for extending water mains, requiring 300 tons of cast iron pipe and a 100,000-gallon steel tank.

To Tyler, Texas, $100,000 for additions to the city's sewage disposal plant, requiring filters, piping, valves and pumps.

To Winston-Salem, N. C., $180,000 for extending the city's sewage system, requiring 100 tons of cast pipe and 330 manhole covers.

To Arkansas State Agriculture and Mechanical college, Jonesboro, Ark., $175,000 for construction of two dormitories.

Congress Ponders Revenue

Little progress is being made on business legislation in congress. Most efforts of congress have been directed toward revenue measures, including legalization of beer. The Kahn bill, requiring the use of do-

mestic materials in federal construction, still is before a house committee. The Goss bill, to prevent bid peddling on federal projects, was favorably reported at the last session and remains on the house calendar.

Hear Fluorspar Troubles

Objecting to recent proposals that the duty on fluorspar be lowered, representatives of Illinois and Kentucky producers told the tariff commission, Dec. 8, that new processes have enabled them to increase their output and make the United States self-contained.

R. C. Allen, representing Oglebay, Norton & Co., Cleveland, said that if Illinois and Kentucky mines continue to shut down there will be no acid grade spar for industrial requirements.

□ □ □

The shipping board has called for bids, Dec. 28, on 40 wartime vessels to be scrapped, the first to be begun by Jan. 15 and the entire lot within 13 months.

□ □ □

Only 2388 immigrants entered the United States in October, according to the bureau of immigration. This compares with a monthly average of 2419 for the first nine months of this year.

□ □ □

The interstate commerce commission has rescinded one of its former findings to the effect that intrastate rates on iron and steel articles, in carloads, from certain origins in Illinois to certain destinations in Illinois were unduly preferential of those destinations and unduly prejudicial to Keokuk, Iowa. The original order has been vacated and the complaint dismisesd.

□ □ □

The customs bureau has decided to allow a 30 day notice before putting into effect its ruling that nipples made from short lengths of steel pipe not exceeding 12 inches in length, by threading each and commercially known as pipe fittings, are dutiable at 45 per cent ad valorem under paragraph 397 of the tariff act, as manufactures of metal not specially provided for, rather than as pipes under paragraph 328.

Financial News of Steel Industry

FROST STEEL & WIRE CO., Hamilton, Ont., reports net loss of $22,931 for the fiscal year ended Oct. 31. After all deductions and payment of preferred dividends, a charge of $38,192 was made to surplus, reducing that to $663,791.

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National Steel Corp., Pittsburgh, has declared a dividend of 12½ cents on the common stock payable Dec. 30 to record Dec. 20. This rate is unchanged from that of the last quarterly payment.

Form Standard Stainless

The Standard Stainless Steel Corp., Charleroi, Pa., has been organized to produce stainless steel under the patents of the Buffalo Electric Furnace Co., Buffalo, with operations scheduled to begin this month. This arrangement with the Buffalo company represents the execution of the latter's first nonexclusive license agreement, it is said.

Chain Bids Are Opened

New York—McKay Co., McKees-Rocks, Pa., has been recommended for the contract for 319 tons wrought iron open link chain, ¾ to 1⅝-inch iron, for the lighthouse bureau, Staten Island, New York, on a bid of $21,126.62, delivered. American Chain Co., Bridgeport, Conn., is low on 39,000 feet of close-link galvanized chain for delivery to Mare Island navy yard, Calif., at $2163.50. Woodhouse Chain Works, Trenton, N. J., has been recommended for award of 18 tons of wrought iron stud links chain, 1½ to 1⅜-inch iron, at $2654.83 and Baldt Anchor & Chain Co., Chester, Pa., for 63 tons of wrought steel buoy shackles at $6027.22.

Steel Bookings Lose Gains of Three Months

Following a slight increase for three consecutive months, unfilled bookings of the United States Steel Corp. as of Nov. 30 declined 28,739 tons, or 1.45 per cent, to a total of 1,968,301 tons. The decline about cancelled the gain made during August, September and October. Prior to August, unfilled bookings had declined for 16 consecutive months. Further comparisons follow:

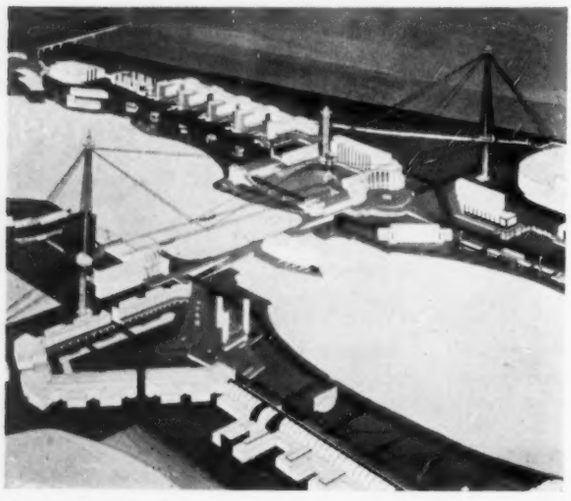
1931	Unfilled orders tons	Net change tons	Per cent change
Jan. 31	4,132,351	188,755+	4.78+
Feb. 28	3,965,194	167,157—	4.04—
Mar. 31	3,995,330	30,136+	0.73+
Apr. 30	3,897,729	97,601—	2.24—
May 31	3,620,452	277,277—	7.11—
June 30	3,479,323	141,129—	3.89—
July 31	3,404,816	74,507—	2.14—
Aug. 31	3,169,457	235,359—	6.91—
Sept. 30	3,144,833	24,624—	0.77—
Oct. 31	3,119,432	25,401—	0.80—
Nov. 30	2,933,891	185,541—	5.94—
Dec. 31	2,735,353	198,538—	6.77—
1932			
Jan. 31	2,648,150	87,203—	3.19—
Feb. 29	2,545,629	102,521—	3.88—
Mar. 31	2,472,413	73,216—	2.87—
Apr. 30	2,326,926	145,487—	5.88—
May 31	2,177,162	149,764—	6.44—
June 30	2,034,768	142,394—	6.54—
July 31	1,966,302	68,466—	3.36—
Aug. 31	1,969,595	3,293+	0.16+
Sept. 30	1,985,090	15,495+	0.78+
Oct. 31	1,977,040	11,950+	0.62+
Nov. 30	1,968,301	28,739—	1.45—

Dravo Starts on Dam

Dravo Contracting Co., Neville Island, Pittsburgh, has been awarded the contract to build the London, W. Va., lock and dam at $1,571,925. Over 250 men already have started work at the dam, and part of the 1600 tons of various forms of steelwork are being fabricated at the company's plant.

200 Back at Richmond, Ind.

Two hundred men have just returned to work at the factory branch at Richmond, Ind., of the International Harvester Co. All the men re-employed had service records of five years or more. Officials of the company expected the men would be employed throughout the winter.



Two thousand tons of structurals and 1000 tons of cable will supply a "skyride" for visitors to the Century of Progress exposition at Chicago in 1933. Rocket cars will operate 200 feet above ground between two 600-foot steel towers. On each tower will be an observation platform. The 2000-foot wind-power tower pictured on page 9 of the Nov. 21 issue of STEEL *will not be erected*

MIRRORS OF MOTORDOM

DETROIT

ACTUAL assembly of automobiles last week and this is the greatest for any fortnight in five months, and while there will be a slight decline next week, due to the Christmas holiday and the fact that only short runs are required to stock dealers in some lines, December output undoubtedly will be the largest since July and will approximate the 111,141 units of that month.

At this juncture, January appears equally good. Indications are that Chevrolet will carry over its 55,000-unit monthly rate on the line introduced Dec. 17, and at least make a start on parts for its much-discussed smaller car. Ford will be swinging into production on his new models, it being reported that the tentative schedule for January is an average of 1000 units daily, four days a week.

Some manufacturers, of which Hudson-Essex, Olds and Pontiac are typical, will be as active in the first half of January as in the last half of December. They, with Chevrolet and Ford, are expected to offset slackness of those makers who by Jan. 1 will be past the crest of their pre-show production and will mark time pending the verdict of the shows and some indications of the trend of business.

December Releases Growing

Steel and other materials entering into December assemblies in Detroit were largely shipped last month, and thus far in December the aggregate movement to Detroit has been somewhat lighter. But fresh releases, especially by Chevrolet and Ford, are promising to turn the tide, and December may prove a better month for material suppliers than seemed probable ten days ago.

Increased activity at Fordson and further specifying of materials and parts denote that major decisions are being made. As has been stated before, the picture at Fordson changes rapidly and in the past week there has been a swing to the view that the new Ford line will consist of a low and a medium-price eight, the latter slightly higher priced than the present V-8, but a four and a six are ready.

Ford orders are a factor in specifications which enabled a local steelworks to operate five of its six open-hearth furnaces last week. The decision to use an aluminum head on the larger eight, affording a higher compression ratio, is believed final. Incidentally, Hudson probably will use a combination iron and aluminum head on its 1933 eights.

Ford Revamping Assembly

Retooling is proceeding rapidly at Fordson and some new equipment has been purchased. The preliminary work of adapting the assembly line at Fordson to the new models will probably be accomplished during the remainder of this month, but it is unlikely that other than handmade cars will be available by the time of the New York show, Jan. 7.

Continental, whose president has announced that it will build two sixes for 1933, the larger to replace the present DeVaux, is expected to introduce something radical in selling methods, perhaps trying to deal directly with buyers, eliminating dealers and setting up factory distributors in important centers. Although much preliminary work was done on a small car, excepted to be a four, it is officially stated that the new line will be full-sized.

Material for the first 100 Continentals, for which such designations as Beacon, Flier, Pilot and Ace have been considered, has been received and the assembly line at Grand Rapids is being adjusted to them. The schedule is 250 in December, 2500 in January. The new Continentals will have fender valances and snowplow radiator shells.

Olds, continuing both the six and the eight, is expected to introduce more refinements in body than in engine. There will be horizontal instead of vertical louvres in the hood, a V-type radiator shell with fins rising diagonally from a center bright strip, a hood with a top noticeably rounded, fender valances which follow the contour of the tires closely, and, of course, the Fisher no-draft window ventalation. The Olds schedule is 2300 units in December, 6000 in January.

Olds will probably not be displayed until the New York show, along with the new Cadillac and LaSalle, but the new Pontiac is expected to be introduced during the holiday week.

The new Hudson and Essex lines, now in production, also will not be brought out until show time, but it is understood that the style wave of fender valances and snowplow fronts also has engulfed this maker. It is said that there will be a terraplane eight as well as a revised terraplane six and that both of these lines will have what is regarded as a standard tread, or about 56 inches.

Hudson Also Ventilates

With the Essex pacemaker six discontinued, it is logical to expect a six between the terraplane eight and the lowest-price Hudson eight, presumably bearing the Hudson name. Hudson engineers have been working on a body ventilation plan, chiefly utilizing the windshield and contesting the emphasis General Motors is putting upon the new Fisher divided windows.

Graham, which is making comparatively few body and engine changes for 1933, for one reason because it is in the enviable position of having set a major style in 1932 with its fender valances, reopened its body plant at Wayne, Dec. 13, and is beginning assembling this week.

Industrial Men in the Day's News

Dr. Irving Langmuir, Nobel Prize Winner in Chemistry, 1932

TO the steel industry he is known as the discoverer of the process of electric welding by the atomic hydrogen method.

FEW scientists can muster as many medals and honors as he; England, Italy and now Sweden join the United States in recognizing his achievements.

AT present Doctor Langmuir is concentrating on the mechanism of chemical reactions taking place on solid surfaces.

DR. IRVING LANGMUIR, associate director of the General Electric Co. research laboratory at Schenectady, N. Y., received in Stockholm, Dec. 10, the greatest recognition that can come to a scientist—the Nobel award in chemistry for 1932.

Only once before in the 31 years that the Swedish Academy of Science has been making this award has an American chemist been honored. While many of Doctor Langmuir's achievements are in the field of electric lighting, none of his discoveries is more important than the process of electric welding by the atomic hydrogen method, whereby welds can be made without any trace of oxidation by the passage of a stream of hydrogen through an electric arc, the heat of the arc disintegrating the hydrogen molecules into atoms, which recombine beyond the arc into molecules and in so doing liberate an enormous heat.

Doctor Langmuir was born in Brooklyn, N. Y., in 1881, was graduated from the School of Mines of Columbia university in 1903, received his master's degree and that of doctor of philosophy at the University of Goettingen, Germany, and was instructor in chemistry at Stevens Institute of Technology from 1906 to 1909, when he joined the research staff of the General Electric Co.

Previous honors to come to Doctor Langmuir, who as noted in STEEL for Nov. 21, was an associate director with Dr. William David Coolidge, who on Nov. 1 became director of the General Electric laboratory, include the Nichols medal of the New York section of the American Chemical society, the Hughes medal of the Royal Society of London, the Rumford medal of the American Academy of Arts and Sciences, the Perkins and Chandler medals, and the Cannizaro prize awarded by the Royal Academy of Lincei.

Doctor Langmuir has been particularly interested in the mechanism of chemical reactions taking place on solid surfaces. He is now engaged in working out the laws according to which atoms and molecules distribute themselves over surfaces, forming monatomic layers (single layers of atoms)—laws of importance in understanding many simple phenomena such as those of the spreading of oil films on water and of lubrication.

JAMES H. GILHULY, district sales manager at San Francisco for the Youngstown Sheet & Tube Co., Youngstown, O., will retire Dec. 31. He will continue in the employ of the company, but without the responsibilities of daily attendance.

Alexander G. Oakley, district sales manager, of the Seattle office of the Youngstown company, will succeed Mr. Gilhuly in San Francisco.

E. K. Blackford has been appointed sales manager at Seattle, in succession to Mr. Oakley.

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George C. McMullen, for 15 years with the Timken Roller Bearing Co. and organizer of the industrial bearings division of that company, has joined the Tyson Roller Bearing Corp., Massillon, O., as manager of industrial sales. The Tyson corporation manufactures a complete line of cageless tapered roller bearings and has sales representation in Buffalo, Cleveland, Cincinnati, Chicago, Detroit, Denver, Pittsburgh, New York and San Francisco. Prior to joining Timken, Mr. McMullen, who is a graduate of Lowell institute and Massachusetts Institute of Technology, was with the Timken-Detroit Axle Co.

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Nelson B. Garden, electrical and mechanical engineer, has returned to H. O. Swoboda Inc., Pittsburgh. He has specialized in heating and engineering problems and will assist the Swoboda staff in the production and servicing of its electric heating specialties.

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William J. O'Meara, identified since 1919 with the General Electric Co., Schenectady, N. Y., and recently in the Philadelphia office, has been appointed engineer of the Baltimore office.

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Werner Troeger, export manager of the Harnischfeger Corp., Milwaukee, has returned home after spend-

ing a year and a half in studying markets and conditions and contacting with foreign sales representatives of the company.

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J. Kaye Wood, who has resumed his practice as consultant in mechanical and structural engineering, is vice president and chief engineer of the newly-formed General Spring Corp., 11 West Forty-second street, New York.

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Henry D. Sharpe, president and treasurer, Brown & Sharpe Mfg. Co., Providence, R. I., has been elected president of the New England Council, in which he has been active since its organization, especially in the Rhode Island section.

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Harry Hardwick, formerly district manager of sales, tool steel division of the Ludlum Steel Co., at Chicago, has been appointed sales executive of the Ziv Steel & Wire Co., of Chicago. Mr. Hardwick has been identified with the Ludlum company and its subsidiary, the Atlas Steel Corp., for 17 years.

Obituaries » » »

ARNOLD K. REESE, 65, graduate of Lehigh university, formerly with Pennsylvania Steel Co., and since 1901 blast furnace engineer in England, died at Johannesburg, South Africa, Dec. 10. During the war he headed iron and steel production in England under the minister of munitions, refusing a knighthood and retaining his American citizenship.

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George E. Dean, president, Union Steel Products Co., Albion, Mich., died Dec. 2.

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William C. Fowler, 56, secretary of the Hofius Steel & Equipment Co., Seattle, with which he had been associated 15 years, died Dec. 3.

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George W. Crane, 55, former manager of the heating department of the W. A. Case & Son Mfg. Co., Buffalo, died recently at Syracuse, N. Y.

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George P. Baldwin, 58, vice president of the General Electric Co., Schenectady, N. Y., principally in connection with steam railroad electrification, died Dec. 7 at New York.

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A. E. Barlow, 58, vice president and sales manager of the Moto-Meter Gauge & Equipment Co., Long Island City, N. Y. died in Detroit, Dec. 12. He had been located in Toledo.

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Andrew C. Dallas, 83, founder of the Dallas Brass & Copper Co., Chicago, died in that city Dec. 10. The Dallas company now is a division of Revere Brass & Copper Inc., Rome, N. Y.

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Edwin Ruud, 78, president of the Ruud Mfg. Co., Pittsburgh, died at Pittsburgh, Dec. 9. He was born in Norway in 1854 and came to the United States in 1882, locating in Pittsburgh a short time later.

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Louis C. Cowles, vice president and general manager, C. Cowles & Co., makers of automobile hardware, New Haven, Conn., died Dec. 11. The firm was founded by his father, Ruel, and the son had been connected with the firm since a youth.

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William B. Shoemaker, 58, superintendent of construction for Hibben & Co., South Chicago, Ill., who was in direct charge of building the Iroquois and Federal blast furnaces in South Chicago, died Dec. 14.

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Charles E. Kunkle, for nearly 40 years employed by the Jones & Laughlin Steel Corp., Pittsburgh, died at Pittsburgh, Dec. 9. At the time of his death he was chief draftsman of the Keystone structural works, Pittsburgh, of the Jones & Laughlin Steel Corp.

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Donald A. Stewart, assistant secretary and treasurer of the Allis-Chalmers Mfg. Co., Milwaukee, died Dec. 8. He was born in Scotland in 1878 and came to this country when 12 years old. He began as bookkeeper with the Allis-Chalmers organization in its Chicago office in 1901 and became assistant secretary and treasurer in 1923.

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William A. Kahn, 68, mechanical expert and machine designer of Milwaukee, died Dec. 9. As an erecting engineer for the old E. P. Allis Co., he went to Buenos Aires in 1908 on a street railway project and a year later to London, on an underground railway contract. Later he became general foreman of the shops of the Davis & Thompson Co., Milwaukee, specializing in the manufacture of special milling machines and other machine tools. He was born in Sauk City, Wis., and attended the University of Wisconsin.

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Col. Robert L. Streeter, 52, prominent consulting engineer and a former vice president and chief mechanical engineer of the United States Aluminum Co., New Kensington, Pa., died at Chicago, Dec. 10. He was the author of several text books on gas engine design and had served on the research committee of the American Society of Mechanical Engineers. During the World war he was commandant of the Rock Island arsenal, prior to which for a seven-year period he was professor of steam and gas engine design at Rensselaer Polytechnic institute, Troy, N. Y.

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Joseph E. Bachelder, 75, formerly vice president of the Fairbanks-Morse Water Supply Co., Chicago, died Dec. 12 at his home in that city. He was formerly connected with the Deane Steam Pump Co. and the International Steam Pump Co. In 1901 he joined the steam pump department of the Fairbanks-Morse company, becoming general sales manager of the department soon afterward.

Here and There In Industry

STEWARTS & LLOYDS, British ironmasters, have retained H. A. Brassert & Co. Ltd., British affiliate of H. A. Brassert & Co., engineers, Chicago, to supervise construction of a blast furnace and steelworks plant at Corby, Northamptonshire, England, where a large reserve of iron ore exists. The ore is of a grade to produce basic bessemer steel and about 500,000,000 tons is estimated to be available. Steel of this grade formerly has been imported from the Continent. A tube mill will be included in the steel plant. Estimated cost of the plant is £3,300,000, which is to be obtained as a loan from the Bankers' Industrial Development Co. Ltd., an organization with powerful financial backing, formed to assist sound industrial development.

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Pierce, Butler & Pierce Mfg. Corp., Syracuse, N. Y., manufacturer of cast iron boilers, steel radiators and similar equipment, has filed a voluntary petition in bankruptcy. Irving N. Beeler, president, has been appointed receiver. Reorganization is expected to follow. The corporation, having assets of $10,500,000, was organized in 1914, operating plants at Syracuse, Oswego and Eastwood, N. Y., Huntingdon, Pa., and Zanesville, O.

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Shannon Engineering Co., Seattle, has been formed by W. D. Shannon and four former Stone & Webster engineers. The company will enter general engineering practice. Mr.

(Please turn to Page 55)

EDITORIAL

Management Is Abandoning Unpromising Properties

ONE by one some of the most famous units of the iron and steel industry are being relegated to the scrap heap. Within recent weeks the doom has been sealed for several properties whose very names are reminders of a day when steel was indeed a prince.

Work is progressing on the dismantling of the blast furnace, buildings and machinery comprising the Soho works of the Jones & Laughlin Steel Corp. This stack, situated on the north side of the Monongahela river and nearer the center of Pittsburgh than the six Eliza blast furnaces, dates from 1872. It has been idle for eight years—even during the period of heavy demand in 1928 and 1929.

"B" blast furnace, one of the 11 stacks at Edgar Thomson works of Carnegie Steel Co., is in the process of being abandoned. It was built in 1880 and saw service during that dramatic period of development when the name "Edgar Thomson" was symbolic of the best and biggest in the industry.

Early this month the United States Steel Corp. announced that Newburgh steelworks of American Steel & Wire Co. at Cleveland will be abandoned next summer. Steelmaking activities for the district will be concentrated at the Lorain works of the National Tube Co., 27 miles distant. This decision retires a steelworks which has been identified with a steelmaking community unusually rich in tradition. Newburgh, like Edgar Thomson, was a birthplace of many important early achievements in the development of steel.

Depression Forces Industry To Concentrate Operations in Its Best Plants

Abandonment of these and many other landmarks is indicative of the action the steel industry is being forced to take in order to scale down its plant, equipment and personnel to a basis of efficiency. Management now realizes that no company can hope to cope with present conditions successfully unless its activities are concentrated at the points of greatest effectiveness. Capital and other resources must be put to work wherever the opportunity for a reasonable return is greatest. This requirement sounds the death knell for plants that are hopelessly obsolete, are poorly situated geographically, are harassed by exorbitant taxes or other legislative restrictions, or are otherwise incapable of profitable operation.

The process of getting out from under the burden of an idle plant is long and painful. Today the chance of selling an abandoned property is remote. Even after the equipment is dismantled and the buildings razed, the taxes on the land remain a serious burden. If the plant has operated up to the time of abandonment, the shock of its closing upon the community is a factor that must be considered.

But in spite of the difficulties involved, weeding out the more obsolete capacity and writing down the plant and equipment account to surplus are measures that should be given most careful consideration by every board of directors in the iron, steel and metalworking industries. As pointed out in an article in the Dec. 5 issue of STEEL, writing down plant to surplus not only provides a better balance sheet structure, but also actually improves the earnings statements in that the item of insurance is eliminated, taxes are reduced and maintenance charges are wiped out.

Excess of Truly Potential Capacity Probably Is Far Below Most Estimates

Another important advantage lies in the effect on capacity statistics. Today steelmaking operations are stated at "15 per cent of capacity," which percentage is based upon an annual capacity of 67,473,630 tons as of Dec. 31, 1931. Under present conditions only the cream of the open-hearth, bessemer and electric units is truly potential capacity. A large part of the 67,473,630 tons represents furnaces that are hopelessly out of the running in today's market.

Maintaining such a high figure of total capacity as a basis for statistics is harmful in two ways. First, it depresses the operating rate to a fictitious, low level. Secondly it gives rise to the assumption that there is a tremendous excess, potential capacity in the industry, and, unfortunately, the intangible threat of overcapacity influences prices and destroys morale.

The more one studies the physical facilities of the steel industry, the more one is convinced that the real excess capacity, if any, is far less than is generally believed, and that the rate of abandonment of obsolete capacity has been too slow.

That management now is speeding the process of housecleaning is commendable.

THE BUSINESS TREND

Caution Should Rule in Predictions for 1933

THE season for annual opinions on the business outlook is at hand. Last week in Cleveland, Col. Leonard P. Ayres, banker and economist, presented his view of what the country may expect in 1933. Here are a few excerpts from his remarks:

"The problem of trying to forecast the business developments of 1933 is one that involves in large measure the attempt to guess or estimate the degree to which the policies of the new administration will be formulated with wisdom and its actions guided by sagacity.

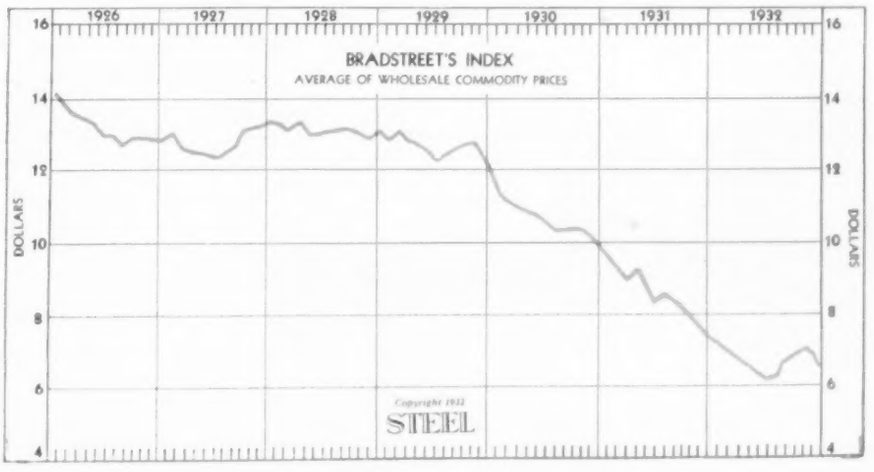
"Legislative and administrative policies will probably tip the balance either toward the attempt to restore price levels by inflation or toward that to facilitate the adjustment of our national economy to lower price levels. It is probably prudent to expect that the long hard grind of sound money and readjustment will be chosen. In that event 1933 will probably prove to be another year of depression during which halting and irregular progress will be slowly achieved in the building of foundations for recovery."

Colonel Ayres refrained from predicting the course of iron and steel output, car loadings, volume of employment, etc., declaring that these "may be so greatly influenced by political developments, as well as by more impersonal economic forces, that they defy prediction." He did hazard the estimate that automobile output in the United States and Canada in 1933 will range from 1,250,000 to 2,000,000 units.

Business Now Subject to Influences Beyond Realm of Prediction

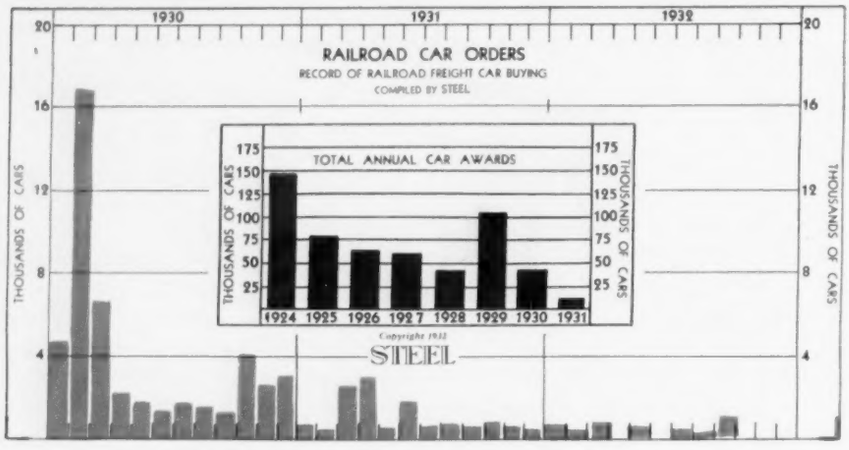
The caution displayed by Colonel Ayres is understandable. In ordinary circumstances, the trend of business responds to certain well understood influences, and predictions can be made with reasonable certainty. Today business is sensitive to so many intangibles that even the most painstaking estimate of the future can be little more than an opinion. Unforeseen events can so easily tip the trend favorably or unfavorably that management should not take predictions as sericusly today as they were viewed when times were more normal.

Probably the safest course to pursue is to make the best showing possible under existing conditions, but always with a keen eye on future opportunity.



1931	
Dec. 1	$8.09
Nov. 1	8.08
Oct. 1	8.29

1932	
Dec. 1	$6.89
Nov. 1	6.97
Oct. 1	7.28



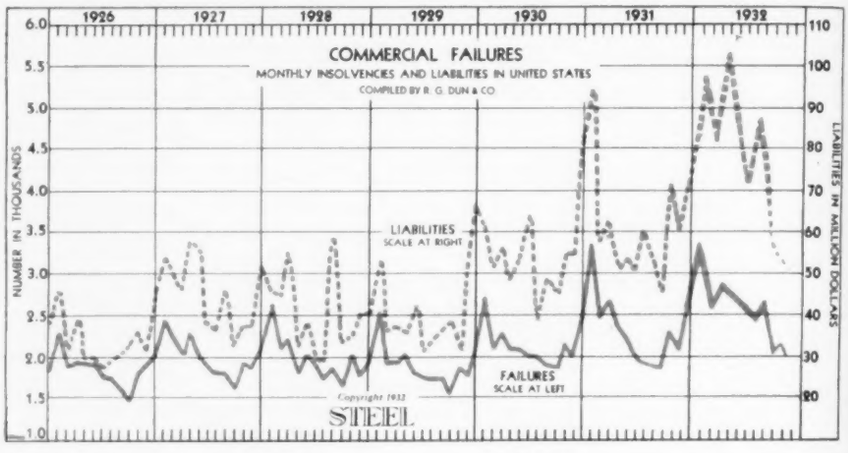
	1932	1931
November	2	35
October	0	980
September	1,298	703

November Car Awards Reflect Market Dullness

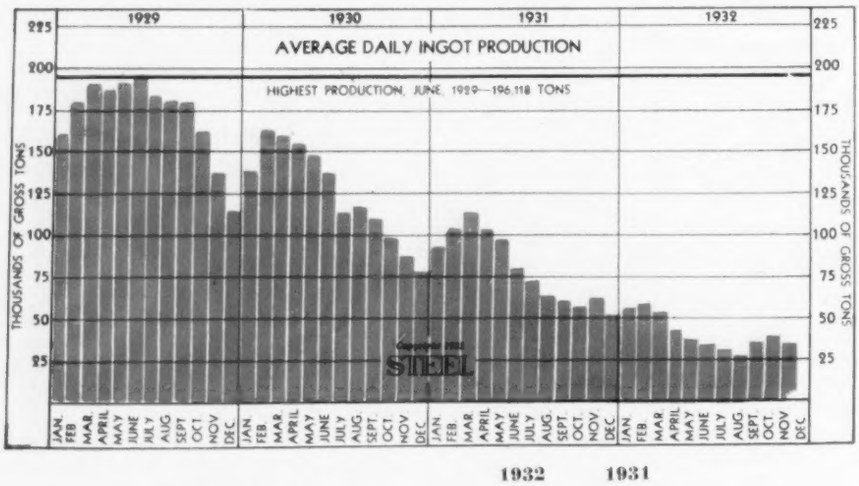
With the awarding of only two domestic freight cars for November and the total for the 11 months amounting to only 1689 cars, builders have keenly felt the result of strict economy measures that have been forced upon the buyers of rolling stock. While car buying is negligible there is, however, a fair business in spare parts. In November last year there were orders placed for 35 cars, with a total of 9683 cars during the 11-month period.

Failures Show Improvement During November

With only 2073 commercial failures reported in the United States during November the number of defaults fell below those for any month since September a year ago. According to the records of R. G. Dun & Co., in October the number was 2273, while for November last year, 2195 failures occurred. Due to some large failures in November, liabilities at $53,621,127 gained slightly over the $52,869,974 indebtedness shown in October.



Number	Liabilities
Nov., 1932.....2,073	Nov., 1932....$53,621,127
Oct., 1932.....2,273	Oct., 1932.... 52,869,974
Nov., 1931.....2,195	Nov., 1931.... 60,659,612



	1932	1931
November	39,031	63,666
October	41,098	58,896
September	37,502	59,439

Ingot Production Rise Checked in November

The average daily production of steel ingots during November was 39,031 gross tons, which was at the operating rate of 18.5 per cent. This current figure represents a moderate decline from the 41,098-ton rate of October, and ended the upward movement which began in September. Calculated output for all companies was 1,014,794 tons in November, compared with 1,068,550 in October and 1,591,644 gross tons in November last year.

By P. E. SHAVER
Sun Shipbuilding & Dry Dock Co., Chester, Pa.

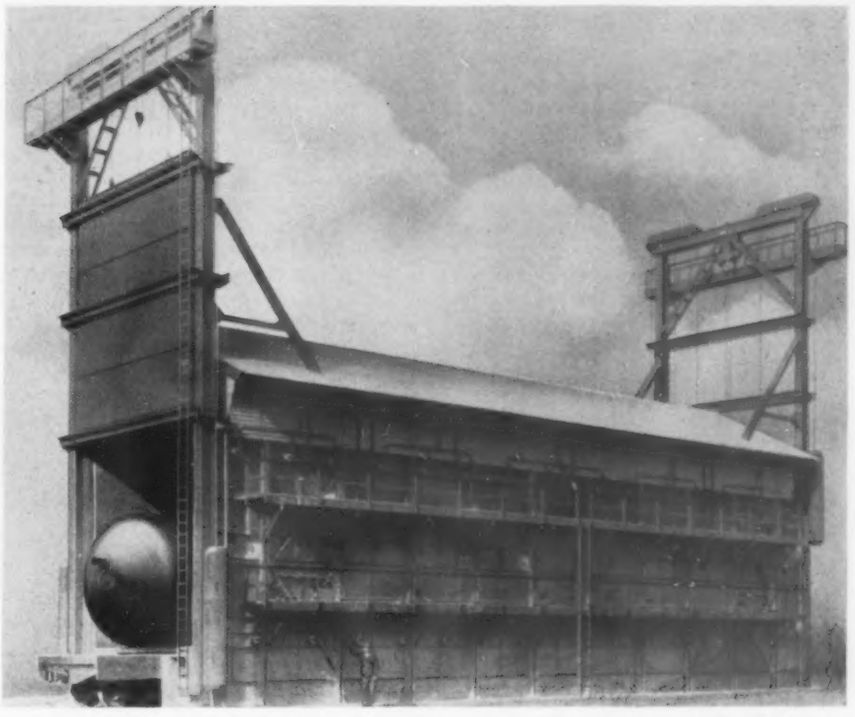


FIG. 1—This furnace, understood to be the world's largest, will be used for stress relieving welded pressure vessels and other welded structural work, and for annealing large steel castings. Inside length is 80 feet and inside width, 18 feet

SHIPYARD INSTALLS ANNEALING AND X-RAY INSPECTION EQUIPMENT

IN ADDITION to shipbuilding, dry docking, marine repairs and the manufacture of diesel engines, the Sun Shipbuilding & Dry Dock Co., Chester, Pa., for some years has built special machinery, pressure vessels, plate work, and the like, for oil refineries and kindred industries. Since much of this equipment is of welded construction, the company was obliged to install special shop facilities including welding equipment, an X-ray inspection outfit, an annealing furnace for stress relieving welded work, and automatic machinery for turning large tanks and boilers during the welding and assembling operations.

Modern shipbuilding makes extensive use of welded construction and also utilizes many unusually large steel castings, therefore, after considerable study and investigation, the management adopted the policy of designing this new equipment to apply to shipyard as well as general requirements.

Ordinarily a furnace for stress relieving welded pressure vessels for land work need not be larger than to handle the largest dimensions for railway shipping clearances, or approximately 11 feet 6 inches diameter by about 80 feet long. To increase the usefulness of this furnace, however, it was built to accommodate vessels 17 feet in diameter and lengths up to 150 feet or longer if necessary. In addition to annealing large welded pressure vessels to relieve all welding stresses, this furnace is to be used for annealing large castings and large sections of welded steel work, thus making it suitable for application to shipbuilding.

Likewise, the X-ray inspection outfit was designed not only for routine examinations of welded seams of pressure vessels, but it is also adapted for examination of castings, forgings and other objects, thus it will be invaluable in examinations of many materials heretofore on the doubtful list.

A welding procedure and the necessary shop equipment for handling work has also been designed and put into operation at this yard.

The new annealing furnace is shown in Fig. 1. It is believed to be the largest furnace of its type built up to the present time. The general dimensions of the furnace are: Inside length, 80 feet; overall length, 82 feet; inside width, 18 feet; outside width, 19 feet 6 inches; inside height above support level, 19 feet 6 inches; total volume, 28,000 cubic feet. The furnace is built of structural steel framing, with a steel casing as the outer shell and is lined with a special light-weight insulating brick 9 inches thick. The insulating brick is fastened to the steel by means of lag screws. A catenary

arch-type of furnace roof is used. For weather protection there is a composition roof covering the entire furnace.

The furnace may be operated at any temperature up to 2400 degrees Fahr., and any temperature within this range may be held uniformly in control through the use of automatic equipment. Design of the furnace is such that any portion of it may be used according to the size of the equipment to be stress relieved. Ends of the furnace are covered by two doors of the vertical-lift type, the doors being operated by electric motors through counterweight systems and pushbutton control. A portable removal bulkhead is used when only a small portion of the furnace is required.

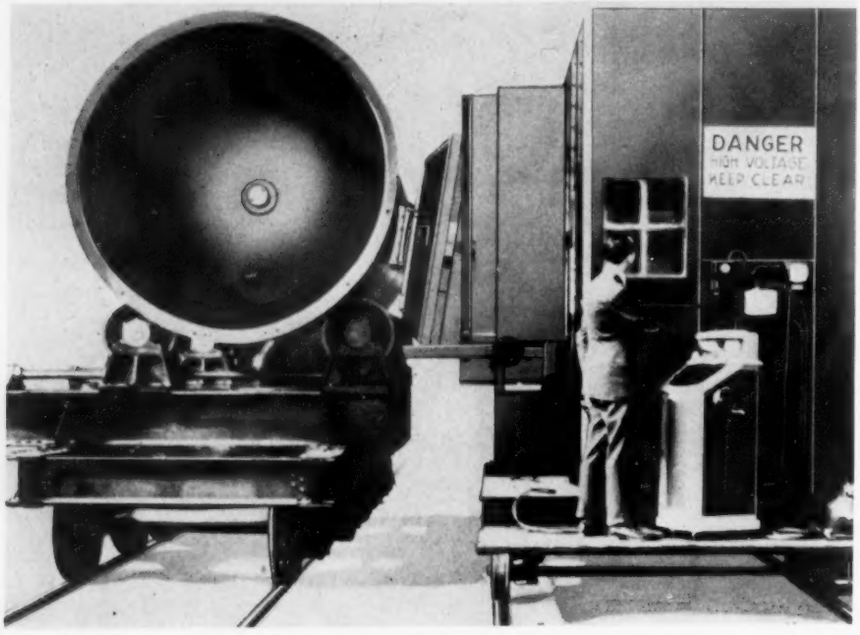


Fig. 2—X-ray inspection of welded work, castings and forgings is afforded with this equipment. To provide ease of operation, the X-ray machine is mounted on one movable table and the work on another. Both are moved either manually or electrically

Annealed on Special Cars

A vessel to be annealed is placed on a special car or cars, depending on its length, and moved on rails within the permanent effective furnace structure. The effective heating length is 80 feet with an extreme width of 17 feet. When annealing vessels over 80 feet in length, the vessel is placed on more than one car and one end is placed in the furnace and annealed after bricking up around the opening between the vessel and the furnace walls, with the door at the protruding end in raised position. When annealing of the one end has been completed, the cars are pulled through the furnace structure so that the annealed portion protrudes out of the opposite end and to the proper position for annealing the other end in a like manner.

The furnace is gas heated with surface-type burners, supplied by the Surface Combustion Corp., Toledo, O., each burner having a capacity of 618 feet per hour of 530 B.t.u. gas operating at 10 pounds per square inch pressure. A total of 62 burners are installed at two levels on each side of the furnace in staggered positions. The gas consumed with all burners operating is 38,316 cubic feet per hour. The location and type of burners is such that local overheating is prevented. The ventilation is obtained by means of openings located in the side walls, the amount of vent space in these openings being controlled by dampers. The interior of the furnace is shown in Fig. 4.

Exact temperature control is obtained by the use of automatic temperature control valves, each operating 6 burners per side or a total of 12 burners per control valve. The furnace thus is divided into five heating zones with a control valve for each zone. The valves are actuated by a thermocouple inserted in the gas space at locations depending upon the type of equipment to be annealed. Temperature recording instruments are provided to record the temperatures of the walls of the vessel at various locations.

Additional temperature recorders give a record of temperatures at various locations in the furnace. A total of 16 temperatures are recorded on this equipment. In addition to the recording temperature instruments, a set of indicating instruments are used which make it possible to determine quickly and accurately the temperature in any location on the vessel being annealed and throughout the furnace. A total of 12 points are connected to the indicating instruments. The temperature recording instruments and the heat control valves were furnished by the Brown Instrument Co., Philadelphia.

This furnace was designed by the company's engineering department in conjunction with the engineering departments of the companies supplying the equipment and materials used. Erection was accomplished entirely with the shipyard's own construction division.

The X-ray inspection outfit was designed and installed by the St. John X-Ray Service Corp., New York. Flexibility and convenience have been obtained by a co-ordinating system of supporting and rotating the welded vessels which are to be examined and of supporting and shifting the X-ray tube. The welded vessels or objects to be examined are supported on two sets of movable tables each mounted on a truck, these tables being moved along a track to accommodate different lengths of objects.

Beam Can Be Tilted

The X-ray generator and tube are mounted on a car on a second track which is parallel to the gear-driven rolls, as shown in Fig. 2. The X-ray tube is enclosed in a lead-lined box provided with an opening on the side toward the vessel, as shown in Fig. 3. This box is mounted in trunnions so that it can be tilted to the X-ray beam emerging through the window at any angle between 30 degrees below horizontal and 30 degrees above. The trunnion frame is movable across the car to permit proper approach to vessels ranging in size from 2 feet in diameter and larger. These motions are controlled by handwheels.

A slow-speed electric drive, controlled from a portable pushbutton station moves the X-ray car along its tracks. The movable tables are moved to position in front of the X-ray tube by movement of their trucks on the rails either manually or by electric motor.

Auxiliary lead shields between the X-ray box and the outer surface of the vessel being X-rayed are attached to the box itself and adjust themselves to the contour of the outer surface as the tube is moved into position, while similar auxiliary shields attached to the film carrier adjust themselves to the contour of the inner surface when the carrier is placed into position. The film carrier is moved along an adjustable rail for longitudinal seams and is held by adjustable stops for the girth

seams and is removed only when passing from one seam to the other. Similarly, adjustments are made for flat work.

Transformers for the X-ray tube and all high voltage connections are enclosed in a metal housing on the X-ray car and with the car itself are thoroughly grounded to the rails. Safety devices are provided to prevent entry to the high-voltage enclosure while the current is on. For examination of smaller castings, forgings and miscellaneous articles a special lead-lined booth is placed on the trucks on which the movable tables operate. This booth is so arranged that the top and sides are removable so that it will be accessible for placing the castings and parts to be X-rayed within. After the object to be X-rayed is placed in the booth, these sides and top are placed back into position completely enclosing the object.

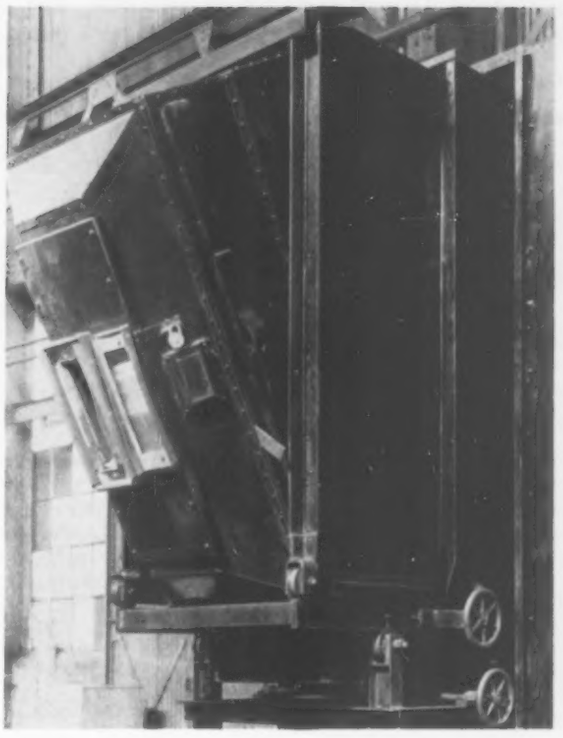


FIG. 3—The X-ray tube is enclosed in a lead-lined box provided with an opening on the side toward te vessel. This box can be tilted from 30 degrees above horizontal to 30 degrees below

Complete Developing Equipment

A dark room for developing and handling films is located near the X-ray machine and is conveniently arranged and completely equipped.

Pressure vessel and welded work is performed by an automatic welding process, complete facilities for which have been installed. The equipment includes the latest improved devices for automatic control and the work while being welded is handled on a large power-driven turning table 120 feet long with weight capacity of 280,000 pounds, so designed as to permit a welding speed of 12 to 48 feet per hour.

This turning mechanism consists of a series of roller wheels forming a cradle in which the vessels rest, one set of these wheels being driven by electric motor through shafting and gears. The motor is variable speed, also reversible, permitting the rollers to be turned in either direction, thereby making it possible to revolve vessels to suit welding requirements. This turning table is installed in the welding shop where also is located the X-ray equipment and is arranged for expeditious handling of all work. A second and similar turning table is provided in the steel fabricating shops for handling all round work. This special machinery and equipment was designed by the company's engineers and constructed in its own shops.

The welding process used by the Sun Shipbuilding & Dry Dock Co. is known as "Sunweld," and is done electrically with a shielded arc. The technique of the process is made possible only by employing the special facilities which have been described.

Standard Welding Machines

Much of the welding equipment is of standard design, but especially arranged to fit into this system. A large stationary welding machine is employed and the shop is wired so that welders can make connections nearest to work. Supplementing this, portable type welding machines and automatic welding heads are used on work most suitable for this type of welding. The procedure meets all requirements of the A. S. M. E. Unfired Pressure Vessel code and is approved by the Hartford Steam Boiler Inspection & Insurance Co. for welding and thicknesses of metal.

An expert in X-raying is employed, and stress relieving and all other problems of metals are supervised carefully by special metallurgists.

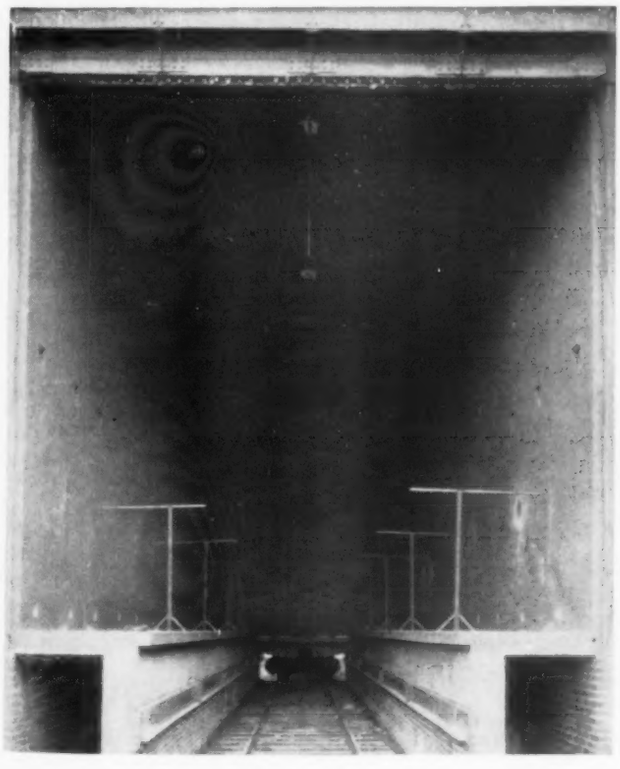


FIG. 4—Interior of the annealing furnace, showing a car in the far end. Thermocouples can be positioned at will and are supported on stands. Just above the thermocouple openings are the dampers, while the burners are at the extreme top and extreme bottom

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A. N. Otis, industrial engineer, General Electric Co., Schenectady, N. Y., described the use of a new electric furnace in forming steel tubes in addressing a joint meeting of the American Institute of Electrical Engineers and the Engineers Society of Western Pennsylvania, in Pittsburgh, Dec. 13.

Compresses Old Automobiles To Bales of Charging Box Size

WITH the remarkable growth of the automobile industry in the last ten years, the problem of how to dispose of worn-out and junked cars is commanding increasing attention. Some are disassembled for salvable parts and remelting scrap; some are sunk behind breakwaters to serve as ballast; but the majority are abandoned in some deserted spot to rust away.

Every automobile has some value as scrap metal, but high disassembly costs usually prevent selling the scrap on a profitable basis. Three years ago, the Ford Motor Co., Dearborn, Mich., conceived the idea of dismantling cars in a large-scale way and to remelt the steel scrap in the open-hearth furnaces. Satisfied with its first efforts, the company increased its operations about a year ago by the installation of a new disassembly line, a 1000-ton hydraulic press for reducing the cars to bales and a 400-ton open-hearth furnace to remelt these large bales.

Press of Record Size

Operations of the new disassembly plant and its equipment were described at considerable length in the Oct. 24 issue of STEEL. In this article, however, the large baling press was discussed only briefly, thus some additional information concerning it is of considerable interest.

This press, said to be the world's largest baling press, was designed and built by Logemann Bros. Co., Milwaukee, and has sufficient size and power to hold a complete automobile or truck and to reduce it to a compressed bundle of open-hearth charging size. As shown in the accompanying illustration, the press is 41 feet long, 30 feet high, 10 feet wide and weighs over 500,000 pounds.

The derelict automobiles or trucks, stripped of engines and many parts of salvable value, roll one at a time down an incline from the disassembly line into the maw or forward end of the press which contains a charging box 17 feet long, 6 feet 8 inches high and 6 feet 2 inches wide. An 8-ton hydraulically operated steel gate is dropped down to close the opening behind the car and with the charging chamber sealed, the compression cycle is commenced.

Two Rams Crush Car

First, a low-pressure horizontal traveling ram, capable of exerting 360 tons pressure, advances against the front of the car and crushes it from a 17-foot length to 30 inches. The 697 cubic foot capacity of the charging chamber is reduced to 102 cubic feet when the horizontal ram reaches its maximum stroke.

As the horizontal ram holds the partially compressed car firmly forward, a vertical ram, weighing 17 tons and operating at right angles, descends from above to effect the final compression. Backed by a 1500-ton pressure, this down-stroke ram crushes the car to an average height of from 10 to 30 inches. Heavy trucks are compressed into a 30-inch high bale.

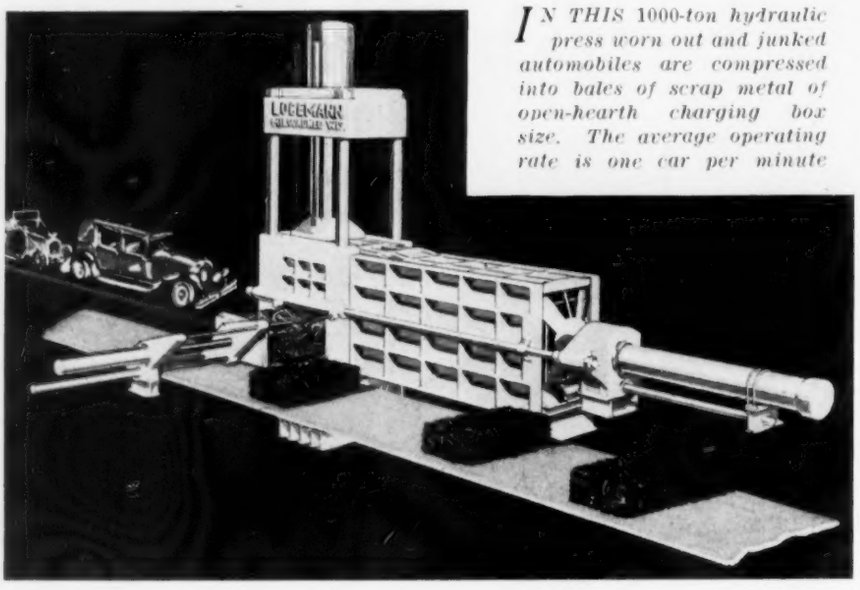
Upon release of the pressure, the high and low-pressure rams recede, the gate raises, and an ejector ram moves forward from the left side of the compression chamber. At the same time a buckerup ram recedes to the right, thus between the two rams the densely compacted bale of steel scrap is discharged onto a conveyor and then taken to the open-hearth furnace.

The powerful rams and their tremendous pressure operate from large double-pressure cylinder pumps of a type developed by Logemann engineers for metal baling presses. Operated in this instance by 300-horsepower motors, this type of pump permits high-speed action at the beginning of operations when required pressures are low. When a predetermined pressure or resistance point is reached, the low-pressure fast-moving cylinder automatically cuts out and its high-pressure, slower, but far stronger mate in the second cylinder completes the operation.

One Man Controls Operation

All press operations are handled by remote control. One man, standing on a platform just above the charging door, directs every move by simply turning a handwheel to which all functions respond mechanically. By interlocking controls the operation is foolproof throughout.

Salvage work on the cars is not necessary to functioning of the press. Because of the tremendous power in the press, automobiles complete in every respect can be pressed into solid tieless bales of scrap without difficulty and at an average rate of one car per minute. From the steel melting standpoint, however, cars must be disassembled at least to the point where all nonferrous metals are removed to prevent contamination in the steel. The Ford company carries disassembly to the maximum to salvage and reclaim worthwhile material.



IN THIS 1000-ton hydraulic press worn out and junked automobiles are compressed into bales of scrap metal of open-hearth charging box size. The average operating rate is one car per minute

Castings Symposium Papers Published in Book Form

Publication of the ten extensive technical papers presented at the symposium on steel castings during the June, 1932, meeting of the American Society for Testing Materials in Atlantic City, N. J., has been sponsored by the former organization and the American Foundrymen's association, which co-operated in the symposium. Complete with discussion, the papers are embodied in a 254-page volume, comprising an authoritative source of information on both carbon and alloy steel castings. Copies sell for $1. Requests should be addressed to the testing materials society offices at 1315 Spruce street, Philadelphia, or to the headquarters of the foundrymen's association at 222 West Adams street, Chicago.

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THE CUSTOM-MADE WELDING WIRE—FOR EXACTING WELDERS

Improving Open-Hearth Furnace Design

By WILLIAM C. BUELL JR.

Part III—Roofs and Their Supports

(Twelfth Article of Series)

AT THE present time there is but one commercial refractory material available for open-hearth roofs, namely silica brick, which universally is used for this purpose solely on account of its ability to retain relatively high crushing values under elevated temperatures. Its propensities to spall, to erode or disintegrate in the presence of the basic reactions of the process or by contact with metallic oxides, its high thermal expansion, and its only fair heat flow resistance properties will cause its early retirement if and when a material economically is made available that will retain silica's one valuable property and minimize the several disadvantageous factors to some degree.

Improve Silica Brick

Manufacturers of silica brick, realizing that an improvement in roof brick was necessary and that in the usual course of technical progress an improved material for this purpose undoubtedly would be found and thus imperil this most profitable market, began researches several years ago in the materials and manufacturing processes with the result that silica roof brick offered today are far superior to those formerly furnished. The tendency to spall has been minimized by the careful grading, grinding and selection of material; methods of binding, both chemically and mechanically, have been much improved; drying and burning now are controlled exactly; and, the rigid specification of the purchaser as to straightness has necessitated that roof bricks be "straight-edged" before shipment, and any distorted brick discarded. Today silica roof brick are a vastly improved product, but the chemical and thermal qualities inherent to the material still leave much to be desired. Experimental use has been made of brick of silicon carbide, magnesite and various compositions of them, but these trials failed so far to hold out promise of favorable results.

Recently there has been a most interesting developemnt in a refractory which indicates favorable possibilities for an improved open-hearth roof material. This new type of neutral-basic refractory, which comprises selected and carefully processed material, is manufactured under precise physical and chemical control and burned at temperatures much higher than those used for ordinary commercial refractory.

The resulting brick has a softening temperature in excess of that of either silica or magnesite brick, a higher crushing value at elevated temperature, withstands spalling tests better than ordinary neutral or basic refractories, and has properties of expansion and heat transmission lower than silica brick. These latter properties are of particular interest in open-hearth design and operation, and if data so far developed experimentally are borne out in practice, even in a major percentage, several of the serious problems of the practice will be solved, at least to a fair degree. The material reacts only slightly or not at all with the basic slags or the metallic oxides of the open-hearth process. Moreover, it may be insulated effectively, thus affording additional possibilities.

Since the refractory weighs somewhat more than silica brick, some measure of redesign of the restraining steel work may be necessary if this material is used in the same depth as silica. However, claim is made that a less depth will give equally satisfactory results, and if so, its application may obviate any alteration in the steel design. The factor, which ultimately will determine the suitability of this new material in open-hearth practice, will be its cost per ton of ingots. Several partial roofs laid up with this new material now are under construction or are in operation.

One of the characteristics of this refractory is the apparent effectiveness with which it may be insulated. Several partial roofs laid up with this type chrome brick are now under construction or operation, and the results from these trial installations will be watched with much interest.

How Costs Are Calculated

The cost of silica brick as used in open-hearth roofs is calculated from the value of the 9-inch standard brick, plus the extra cost for other than the base size, at the rate of 95 cubic inches per 9-inch standard brick which is the volume usually taken for estimating purposes. The 9-inch standard brick (9 x 4½ x 2½ inches) is assumed to cost $45 per thousand at the site of the construction which includes the price of the brick at the point of manufacture, the freight and switching charges, and the transfer within the plant from the freight cars to the site.

The laying cost is taken at $40 per thousand 9-inch standard brick. This includes mason's and helper's labor, and the roof forms or centers. For the purpose of establishing square foot costs, all brick used in roofs are assumed to be 6 inches wide and 3-inches thick, each square foot requiring eight pieces. Brick costs calculated for depths of 12, 13½, 15, 16, 18, 20 and 22½ inches, and as 1 square foot of a depth as designated are presented in Table XXIX.

In view of the difference in detail

Table XXIX

Cost of Silica Brick Open-Hearth Roofs

Roof depth, inches	9-inch equivalent per square foot	Cost factors for brick	Cost of brick per square foot	Cost factor construction	Construction cost per square foot	Total cost in place per square foot
12	18.16	0.045 x 1.30	$1.06	0.04	$0.73	$1.79
13½	20.48	0.045 x 1.30	1.20	0.04	0.82	2.02
15	22.72	0.045 x 1.45	1.43	0.04	0.87	2.30
16	24.24	0.045 x 1.45	1.58	0.04	0.97	2.55
18	27.28	0.045 x 1.60	1.96	0.04	1.09	3.05
20	30.32	0.045 x 1.90	2.59	0.04	1.21	3.80
22½	34.08	0.045 x 2.00	3.07	0.04	1.36	4.43

Roof depth and brick length as indicated. Eight brick 6 inches wide x 3 inches thick per square foot.

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Table XXX

Initial Costs of Silica Brick Open-Hearth Roofs

	Roof				Ribs				
Unit	Depth, inches	Length of outer arc, feet	Area of 36-foot section, square feet	Cost of 36-foot section	Depth, inches	Length of outer arc, feet	Area of 12-foot section, square feet	Cost of 12-foot section	Cost of 48-foot roof
ZA	12	22.74	819	$1466	15	23.26	279.0	$ 614	$2080
ZB	13½	23.03	830	1668	16	23.43	281.5	718	2376
ZC	15	23.26	837	1924	18	23.76	285.0	869	2793
ZD	16	23.43	844	2151	20	24.21	290.8	1105	3256
ZE	18	23.76	855	2608	22½	24.54	294.5	1304	3912

of the various roofs shown in Fig. 21, it appears desirable to treat the cost of silica roofs in a series of depths of roof and ribs that include virtually all of the roofs in use, rather than to compute each cost separately.

Basis of Calculation

The silica roofs of this series are treated as of a constant furnace span 19 ft.—9 inches which is an average figure for a 150-ton furnace, the inner arc of the roof being also constant, but with the length of the exterior arc varying with the thickness of the brick. Brick quantities are calculated as based on the length of the outer arc. It is taken that these roofs will be 3 feet center to center of ribs, that the ribs are 9 inches wide, and the roof section 27 inches wide.

The roof length is assumed to be 48 feet, one-quarter of this length being occupied by ribs and three-quarters by the thinner roof brick. The roof specifications, as taken for analysis, are given in Table XXX, in which the refractory costs of roofs designated ZA to ZE, inclusive, also are developed.

Table XXX discloses that increasing the roof thickness only 50 per cent, (from 12 to 18 inches), nearly doubles the first cost. Whether this increase in first cost is justified must be developed by further analysis, and the first step in this direction is to apportion the first cost of the roof to an ingot tonnage. This, of course, is dependent on the roof life. To ascribe an expected tonnage to a given roof would tend to open the subject to a considerable controversy. Where it is necessary to establish arbitrary values, as in the following case, figures that are reasonable of accomplishment will be used.

Table XXXI

Tonnage and Heats Afforded by Various Roofs

Roof	Depth, inches roof	ribs	Cost of roof	Roof cost per ton ingots	Ingots produced, tons	Life of roof, heats
ZA	12	15	$2080	$0.0745	27,940	186
ZB	13½	16	2376	0.0745	31,880	212
ZC	15	18	2793	0.0745	37,500	250
ZD	16	20	3256	0.0745	43,700	291
ZE	18	22½	3912	0.0745	52,500	350

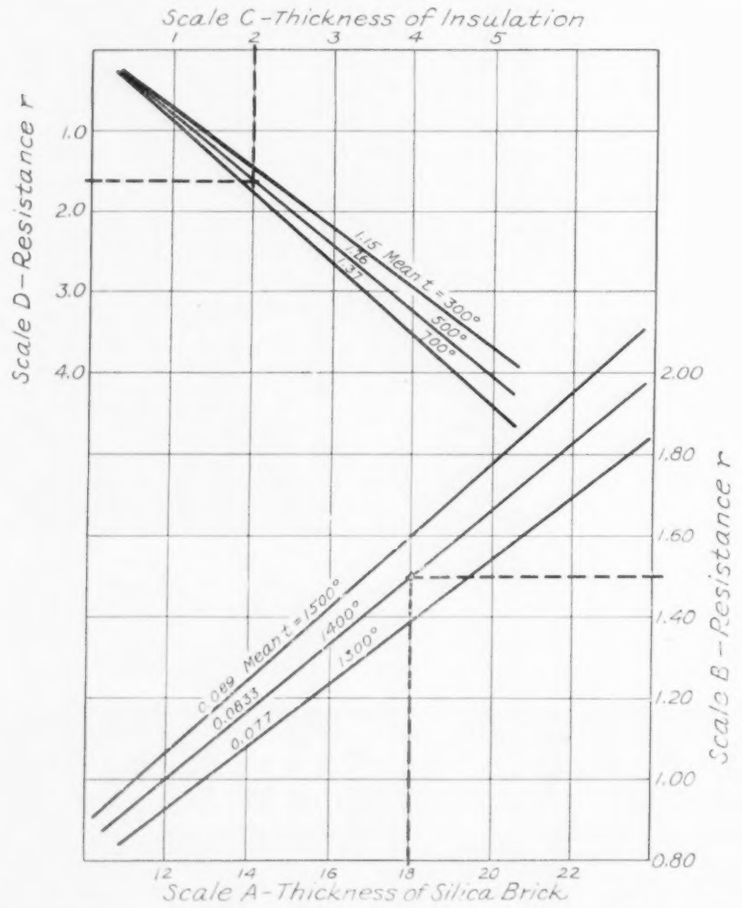


Fig. 22—Chart giving values of resistance, r, for silica brick and insulation as used in open-hearth roofs

The first cost of a roof per ton of ingots produced for use with the economic data later presented, is established as follows: It is assumed that a 15-inch roof with 18-inch ribs and costing about $2793 will last 250 heats. If the furnace is tapping 150 tons of ingots, then the total production on a roof will be 37,500 tons and the roof cost per ton 2793÷37,500 or $0.0745 per ton. If this roof cost per ton of ingots, $0.0745 is considered as generally applying to roofs of varying thickness, then the number of heats and the tons of ingots produced for the various roofs will be as in Table XXXI.

Cost Factors Considered

The roof cost as developed applies against the initial construction cost only and does not include the cost of repairs during the campaign. Ordinarily, "hot" or weekend repairs to the roof are charged as an expense item against the overall furnace campaign operating cost. In any event, these repair costs are indeterminate and should not be included for general analytical or comparative purposes, despite the fact that they may be high and form an important factor in the economics of the roof.

The thermal properties of the vari-

ous roofs as shown in Fig. 21 and based on average flame temperature and velocity values as previously developed are given in Table XXXII. In this table the coefficients, r, are from Fig. 22, using 1400 degrees Fahr. as the mean temperature of the brick; the emission rates are calculated as two and a half times the values for still air which indicates an equivalent air velocity over the exposed surface of the roof of about 3 feet per second. The emission as shown in this table varies within the limits 3910 (furnaces J and K) to 5870 (furnace E and F) B.t.u. per square foot per hour.

Radiation Determined Graphically

In accordance with the methods previously discussed the heat flow or radiation through a silica brick roof may be found conveniently by graphic methods, first, by finding the resistance, r, for brick of the proper thickness, and, second, with r determined, and assuming a temperature of the hotter surface and the rate of air flow over the outer or cooler surface, reading the outer temperature and the emission from the brick. The resistance, r, for roof brick of any thickness may be found by using Fig. 22. In the discussion, the value of 1400 degrees Fahr as the mean temperature of the brick is that used.

The thermal properties of the roof brick may be found as follows with the use of Fig. 23. Enter scale A with the resistance as found from Fig. 22 and erect a vertical line that intersects curve F, the hotter surface temperature which ordinarily is taken as 2900 degrees Fahr. A horizontal line from the intersection at F extended to scale B will indicate the outer surface temperature, or to scale C the differential between the air and the outer surface temperature. A vertical line from the horizontal line at its intersection with the proper emission curve E, to scale D will give the emission rate. The emission curve used is 2.5 E.

How Values Are Found

The values of Table XXXII are calculated by the complete mathematical methods, the equation being:

$$U = \frac{t_o - t_a}{\dfrac{1}{C_1 \times \dfrac{vfa}{vfg}} + R + \dfrac{1}{C_2}} \qquad (5)$$

in which

U=Overall rate of heat transfer, B.t.u. per square foot per hour.

t_o=Temperature of the furnace gases

t_a=Temperature of the surrounding air

C_1=Rate of heat transfer from the furnace gases to the hotter surface of the refractory.

C_2=Rate of heat transfer from the outer surface of the refractory to the atmosphere

R=Combined resistance, which is the sumation of the resistance to heat flow of the refractory substance,

$$\left(\frac{1}{k_1} + \frac{1}{k_2} \text{ .....etc.}\right)$$

vfa=Ratio of heat transfer due to differing velocity of air across the cooler surface

vfg=Ratio of heat transfer due to differing velocity of furnace gases across the hotter surface.

Solved by graphic methods the differences of values as compared to the mathematical method is as follows: in three cases the difference is 9 to 11 per cent; in three cases 5 to 6 per cent; in five cases 3 to 5 per cent, and all others less than 3 per cent. It therefore would appear that the graphic methods may be used without question as a basis of analysis or design. However, all tabular values presented in the discussion of roofs are calculated.

(To be continued)

Table XXXII

Thermal Properties of Furnace Roofs

Furnace	Temperature, ° Fahr. Flame	Inner surface	Coefficient r	Outer surface temperature, ° Fahr.	Emission rate	Heat flow, B.t.u./sq. ft./hr.
Column	a	b	c		g	h
A	3373	2889	1.0	584	11.75	5685
C	3372	3037	1.5	520	10.0	4200
D	3386	2986	1.125	579	11.25	5390
E	3369	2948	1.0	600	11.75	5870
F	3360	2941	1.0	600	11.75	5870
G	3423	3020	1.25	560	10.75	4945
H	3387	3020	1.5	518	10.0	4180
I	3363	2965	1.125	572	11.25	5305
J	3217	2841	1.5	491	10.0	3910
K	3210	2849	1.5	491	10.0	3910
L	3321	2905	1.5	501	10.0	4010
M	3366	2928	1.0	598	11.75	5855
N	3365	2922	1.25	544	10.75	4775
O	3365	2968	1.25	550	10.75	4838

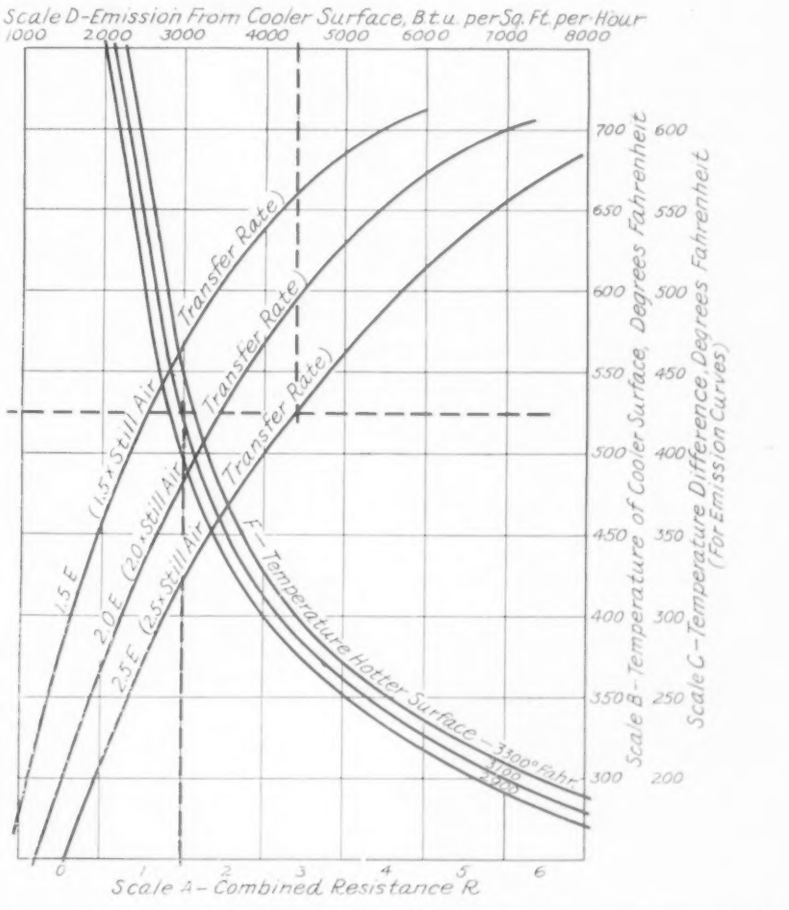
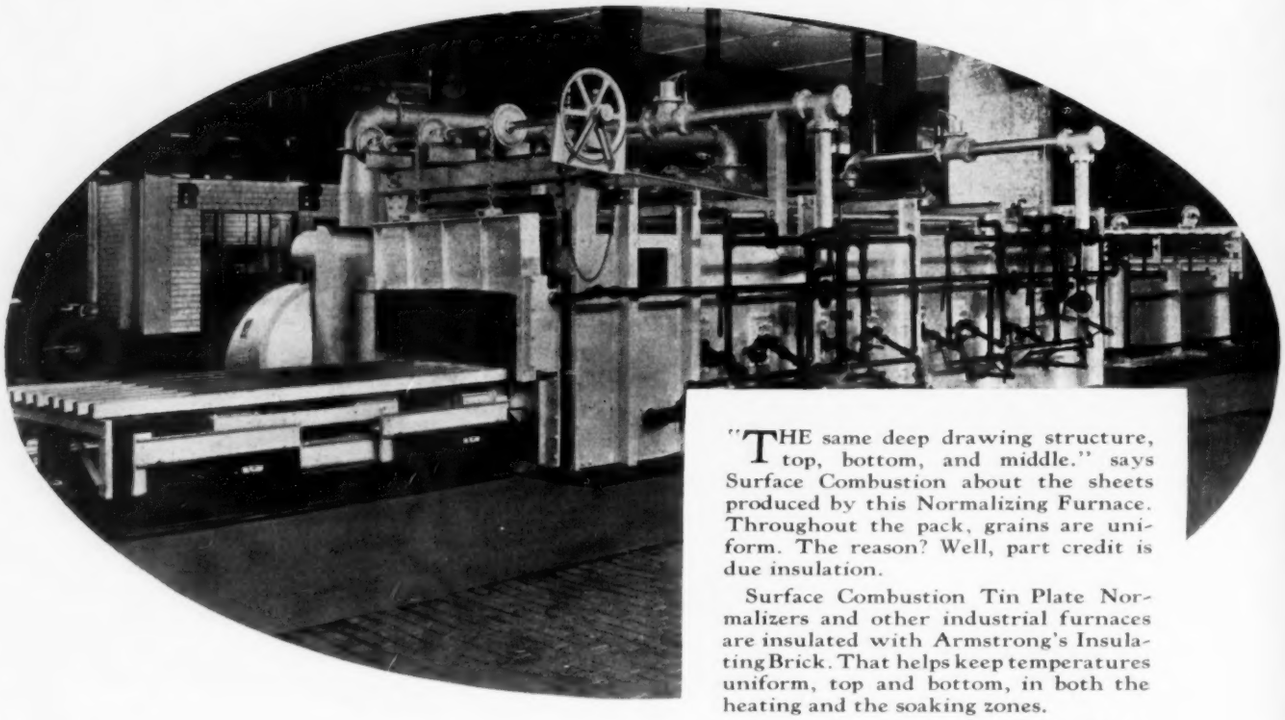

Scale D-Emission From Cooler Surface, B.t.u. per Sq. Ft. per Hour
1000 2000 3000 4000 5000 6000 7000 8000
1.5 E
2.0 E (2.0× Still Air Transfer Rate)
2.5 E (2.5× Still Air Transfer Rate)
(1.5× Still Air Transfer Rate)
F — Temperature Hotter Surface — 3300° Fahr.
3100
2900
Scale A — Combined Resistance R
0 1 2 3 4 5 6
Scale B - Temperature of Cooler Surface, Degrees Fahrenheit
700 650 600 550 500 450 400 350
Scale C - Temperature Difference, Degrees Fahrenheit (For Emission Curves)
600 550 500 450 400 350 300 250 200

Fig. 23—Curves which depict the outer surface temperature and heat emission of open-hearth furnace roofs

WHY (SC) INSULATES THIS TIN PLATE NORMALIZER



"THE same deep drawing structure, top, bottom, and middle." says Surface Combustion about the sheets produced by this Normalizing Furnace. Throughout the pack, grains are uniform. The reason? Well, part credit is due insulation.

Surface Combustion Tin Plate Normalizers and other industrial furnaces are insulated with Armstrong's Insulating Brick. That helps keep temperatures uniform, top and bottom, in both the heating and the soaking zones.

Armstrong's and Nonpareil Insulating Brick do more than hold heat inside the furnace. Their structural strength adds to the permanence of firebrick walls. Because both are machine-sized at the factory, they give a tighter wall, and one that lays up faster. Often they can be laid up dry—a factor which adds to their high salvage value.

Use Armstrong's Insulating Brick for temperatures up to 2500° F. behind the refractory—Nonpareil up to 1600° F. A new Armstrong Insulation—EF Insulating Brick—is especially designed for direct exposure and heat reflection, and is suitable for electric furnaces and other types whose walls are not subject to high abrasion. Write for full information and samples of all Armstrong high temperature insulations. Prompt delivery can be made in any quantity from our centrally located factory in Beaver Falls, Pa. Armstrong Cork & Insulation Company, 920 Concord Street, Lancaster, Pa.

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Look for these features in S-C Tin Plate Normalizers—exclusive with Surface Combustion construction:

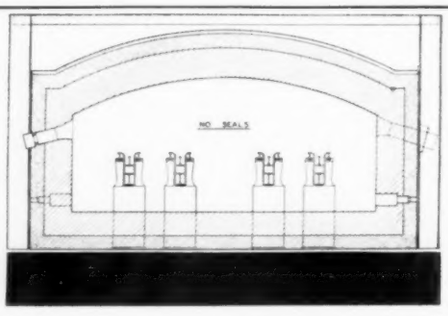
Patented walking beam conveyors, with automatic chain type discharge

Absolutely tight furnace, top, bottom, and sides

Over and under firing, with combination pre-mix and diffusion systems

The diagram at the right shows construction detail of these furnaces, and indicates the use of insulation.

*Quoted from publication of Surface Combustion Company, Toledo, Ohio.



Sulphurized Oils Conserve Power in Drilling Steel

SULPHURIZED oils used as cutting fluids in drilling steel and the harder alloys give lower torque values than other fluids according to Prof. O. W. Boston, University of Michigan, Ann Arbor, Mich., speaking at a session on cutting metals at the annual meeting of the American Society of Mechanical Engineering in New York, Dec. 5-9, collaborating with C. J. Oxford, chief engineer, National Twist Drill & Tool Co., Detroit. Tests were made on nine metals with 11 different cutting fluids, using modern twist drills, ranging from ½ to 1½ inches in diameter. In addition to four grades of steel, including tool steel, the materials used in the tests were cast aluminum alloy, free-cutting brass, cast iron and malleable cast iron, while the fluids employed in addition to dry cutting were borax water, two soluble oils, lard oil, two straight mineral oils, two compounded oils and two sulphurized oils.

A formula of torque and thrust was developed for each material as a function of variable diameter and speeds. The results as submitted in the paper covered the fourth progress report of the A. S. M. E. subcommittee on cutting fluids. With the net output of power for drilling dry expressed as 100, a saving of 33.5 per cent for S. A. E. 1020 steel was made when using a sulphurized oil.

Cutting Conditions Studied

Effect of lathe cutting conditions on the hardness of carbon and alloy steels was discussed in a paper by T. G. Digges, division of metallurgy, bureau of standards, Washington. Tests from which the results were attained were made on low cutting speeds. Study was made of work hardening near the machined surface of steel forgings resulting from cutting with sharp lathe tools, the work being based on hardness measurements.

Of the annealed plain carbon steels ranging from 0.12 to 1.10 per cent carbon, the steel of lowest carbon content showed the greatest increase in hardness at the machined surface. The maximum hardness developed at the surface by machining decreased rapidly with increasing carbon contents of the steels up to about 0.4 per cent, and thereafter less rapidly with further increase in carbon. The depth to which the carbon steels work hardened appeared to decrease with increase in carbon contents. The differences in the susceptibility to work hardening of the annealed carbon steels was not influenced by the nitrogen contents of the steels.

Stainless steel of the ordinary "18-8" composition (not free-machining) had a high capacity to work harden near the machined surface even with small areas of cut, but with increase in area of cut the change in work-hardening values was not so marked. The "free-machining" 18-8 stainless steel with small areas of cut had no marked increase in the surface hardness, but with increase in area of cut there was a continuous increase in the hardness. Work hardening the "18-8" stainless steel (not free-machining) in the lathe tests to the extent of increasing the surface hardness about 40 to 100 per cent had no marked influence on the resistance of the steel to hot nitric acid attack.

Increased by Annealing

The hardness of the cold-worked plain carbon and 3½ per cent nickel steels was, in general, increased by annealing within the range of 100 to 400 degrees Cent., but with further increase in annealing temperature the hardness decreased. The hardness from cold working was removed by heating to 720 degrees Cent.

Progress in the use of cemented carbide cutting tools and their influence on machine tool design was outlined by Arthur A. Merry, district manager, Carboloy Co. Inc., Cleveland, and J. M. Highducheck, supervisor of cutting tools and applications, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Mr. Merry described and moving pictures were shown of a 22-inch super-lathe (STEEL, April 4, p. 51) built by the American Tool Works, Cincinnati, for the General Electric Co., Schenectady, N. Y., the machine being designed for high speeds made possible by the use of cemented carbide cutting tools. While this machine was assembled for this express purpose, Mr. Merry stated that most of the machine tools built in the last few years were capable of handling cemented carbides commercially and with economy. Builders' tests resulted in speeds and feeds beyond the point previously thought impossible for satisfactory work.

Mr. Merry also gave details of a German-built lathe operated by the Mackintosh-Hemphill Co., Pittsburgh, for turning steel mill rolls, the cutting tool being of cemented tungsten carbide. Both machines in design tend toward more weight, power, rigidity and speed. Mr. Merry stated the average shop generally had poor facilities for grinding tools and that the user can save at least 25 per cent of the cutting tool investment by installing proper grinding equipment and placing the grinding in the hands of capable and trained men. Experience in applying cemented carbides indicates that results obtained from modern machine tools and cemented carbides is in direct proportion to the rigidity and power of the machine and the size of the tool these machines will take, he said. Cemented carbides have also made the industry "metal cutting conscious" to a degree which prevailed during the development of the high-speed cutting steels. In the discussion, led by Roger D. Prosser, Thomas Prosser & Son, New York, Mr. Prosser stated that less power per pound of metal removed was evident in the use of cemented carbides. He also stressed the importance of grinding.

Mr. Highducheck told of the Westinghouse Electric & Mfg. Co.'s system under which cemented carbide tools are ground in a special department by experts in this type of work. He stated that at the East Pittsburgh, Pa., plant of the company tungsten carbide tools to the value of $90,000 were in use. He stated, after describing technical details of grinding of cemented carbides as done in that shop, that the wheel cost in grinding new tipped tools averages 35 cents per tool, plus operators' time and overhead. While he indicated dry grinding in many instances appeared to be preferred, the discussion brought out the fact that most users of the material favored wet grinding.

Roll-Neck Bearings

Need for a rugged, precision-type bearing having a capacity great enough to carry existing loads, which may be installed in a limited space available without reduction in neck strength, has been apparent for two-high hot rolling mills, and the development of the Morgoil roll-neck bearing, was described by F. P. Dahlstrom, engineer, Morgan Construction Co., Worcester, Mass. This roll-neck bearing (STEEL, March 21, p. 35) has a high load capacity, generally far in excess of the roll-neck strength.

Strength of roll necks was covered in a joint paper by Prof. W. Trinks, Carnegie Institute of Technology, Pittsburgh, and J. H. Hitchcock, also of that institution. These investigators pointed out that the increasing use of antifriction bearings for roll necks, which frequently necessitate a change in the customary proportions

of roll body and roll neck, has made the question of roll-neck strength an important one. At the juncture between roll neck and roll body, stresses of high intensity occur which cannot be evaluated by the familiar formula of mechanics, and regarding which few directly applicable data were available. In order to evaluate the concentration of stress at this point, and to indicate the manner in which the stress concentration is affected by varying proportions of roll body, and roll neck, rupture tests were made with model rolls of gypsum plaster, having various proportions and several different sizes and shapes of fillet. The test conditions were made to correspond as closely as possible to those of actual rolls in operation. Experimental results were shown, and compared with previous data.

Recommends American Standard Value For Inch-Millimeter Conversion

AN AMERICAN standard value of 1 inch equals 25.4 millimeters, to be used in converting inches to millimeters, was recommended at a general conference in New York recently under auspices of the American Standards association. This conference, arranged at the request of the Ford Motor Co., was attended by representatives of 18 industrial groups having an interest in precise measurements and methods of limit gaging.

The 25.4 conversion factor was recommended unanimously for industrial use, replacing for this purpose both the official ratio 25.40005 and the rounded value 25.4001 given in certain handbooks and tables.

British Ratio Lower

The official British ratio is 25.399978, and the last precise experimentally determined value 25.399956, thus the British official value is about one part in a million below, and the American official value about two parts in a million above 25.4. British industry through the British Standards institution adopted the value 25.4 for industrial use in 1930. This simple ratio has been advocated by Continental European countries.

Adoption of the conversion ratio 25.4 by American industry will secure world-wide uniformity in conversion practice. For example, an American manufacturer having plants in both metric and inch countries desiring to have complete interchangeability of parts regardless of the country in which they are made, can use identical blueprints in the respective countries.

The matter also is of importance on account of the fact that the ultimate check on the accuracy of workshop and inspection gages used in manufacturing practice is made by means of highly accurate reference gage blocks held within a tolerance of a few millionths of an inch per inch.

Participating and co-operating in the conference were the following: P. G. Agnew, secretary, American Standards association, chairman; Dr. Lyman J. Briggs, acting director, bureau of standards; H. W. Bearce, co-chief, division of weights and measures, bureau of standards; E. G. Liebold, Ford Motor Co.; C. E. Johansson, gage manufacturer, associated with Ford Motor Co.; and representatives of American Gear Manufacturers association; American Institute of Electrical Engineers; American Society of Mechanical Engineers; American Society of Swedish Engineers; American Telephone & Telegraph Co., Bell Telephone Laboratories; Brown & Sharpe Mfg. Co.; General Electric Co.; Gage Manufacturer's association; Metal Cutting institute; National Electrical Manufacturer's association; National Machine Tool Builders' association; bureau of construction and repair, navy department; Bausch & Lomb Optical Co.; Society of Automotive Engineers; Manufacturers' Standardization Society of the Valve and Fittings Industry; and Western Electric Co.

Plaster Models Aid in Strength Determinations

With the aid of plaster of paris models, R. J. Roark, associate professor of mechanics, and R. S. Hartenberg, instructor in mechanics, University of Wisconsin, Madison, Wis., are investigating the effect of form on the strength of steel and aluminum machine parts. Accurate predictions of the strength of various metals in machine parts can be made, it is said, by establishing the strength ratio between the plaster and the metal under investigation.

However, Prof. Roark points out, in addition to the strength ratio it is necessary to take account of a "tenderness" factor, or susceptibility to stress concentration, since not all materials are affected equally by irregularities of form. For this purpose, many similar specimens of each material, some with notches, some with holes, some with screw threads or other irregularities of form, are prepared and broken; from the results so obtained it is possible to ascertain the desired relationship.

Materials studied so far include gray cast iron, white cast iron, nickel cast iron, cast alloy steel and three aluminum alloys. Interested manufacturers have supplied the material for specimens. Co-operating in this respect are the Allis-Chalmers Mfg. Co., Motor Casting Co., Sivyer Steel Casting Co., Chain Belt Co. and the Cutler-Hammer Co., all of Milwaukee, the Brillion Iron Works, Brillion, Wis., and the Aluminum Co. of America, Pittsburgh.

Effect of Paint on Interior Lighting Is Studied

Stress has been laid on the merit of suitable paints as aids to lighting. The value of white and light colored paints appears obvious but definite proof has been lacking. To substantiate these assumptions definite tests of the value of various paint colors to lighting were made by D. L. Gamble, research division, New Jersey Zinc Co., New York.

A summary of Mr. Gamble's findings has been published in a recent 12-page booklet issued by the company. Easily understandable charts are reproduced showing the relative amount, in foot-candles, of light reflected by white, yellow, green, gray and black paints. Tests were made in a small room, using four distinct types of lighting—indirect, semi-indirect, direct and natural.

Magnesium oxide paint was used as a standard in making other measurements. Other wall finishes studied were: Pink, mirror, metallic with rough walls and metallic with smooth walls. In all cases, white was found to be the most efficient color, followed in order by yellow, green and gray.

Washer Cooler Operation Discussed in Bulletin

Experimental data and theoretical considerations of the Doherty washer cooler, a device for cooling gas by direct counter-current contact with a cooled recirculated portion of its own condensate from which the objectionable constituents have been removed, are presented in bulletin No. 67, published by the engineering experiment station of the University of Washington, Seattle. The investigation was pursued by Sybren Ruurd Tymstra, instructor in general engineering at the university. The data are preceded by a description of the principle of operation, of the apparatus itself and of its installation.

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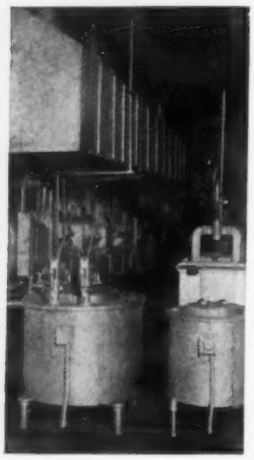
Making the Most of

METHODS AND MATERIALS



TO DETERMINE whether stainless is or is not capable of meeting all the requirements of marine engineering, a new sea-going test is under way in England. A ship, the S. S. CATHAY, with over 70 different parts of the vessel itself and its equipment made from Sheffield stainless steel recently sailed for Australia. Among the parts and articles are steel plates, riveted steel sheets, welded and drawn tubing, wire, wire netting, castings, water taps, sanitary fittings, door fittings, cloakroom fixtures, butcher's fittings, spoons, forks, knives and teapots. The test supplements previous tests virtually establishing stainless steel for these purposes.

S S S

Increasing use of chromium plating has developed recently in the manufacture of fittings and fixtures for delicatessen stores, butcher shops, and similar establishments. The bright, clean, chromium-plated surfaces are pleasing to customers.

S S S

AS CARLOADS of steel and castings are received in the plant of Detroit automotive parts maker, electric industrial trucks remove the material from the cars and place it in storage. This is done by having two men with a hand truck place a skidload of steel at the car door. Here it is picked up by a high-lift truck and speedily carried to the stockroom or direct to the stamping department. In this way, a car of steel can be unloaded in approximately 3 hours.

S S S

It is understood that welded sheet steel frames or stencils are being used in Germany in laying garden and park or other walks in patterned colored concrete. The frames or forms are 10 by 15 feet in size, with upright sides and interior divisions making a pattern of any design and for any number of colors. The form is set on the usual foundation and the colored concrete poured into the proper spaces until the whole frame is filled, then it is moved ahead. It is said that two men can handle the frame and can lay 200 square yards a day.

S S S

A Connecticut ball bearing manufacturer, taking advantage of present conditions to modernize its plant to meet future demands, has installed 500 mercury vapor lamps, distributing them over areas where the absence of glare and the improved visibility of surface and outline afforded by the light from these lamps are advantageous.

S S S

Careless fabrication of pressed steel parts causes no end of trouble in porcelain enameling. Badly worn die equipment may produce hairlines, die marks showing through the finished coat of enamel, and warpage. Improper welding often causes serious difficulty, for too large a tip and too fast a flame may result in blowholes, welds opening up as a black line in the enameling, and increased warpage due to a strain being set up in the welded piece by too intense a flame or heat.

S S S

Thyratron control equipment for resistance welding will operate satisfactorily up to 1800 interruptions per minute on 60-cycle power supply. This means that the "on" period and "off" period include only 1 cycle each. By simple adjustments of snap switches and variable resistance dials, the speed of operation can be changed to give any number of cycles up to 40 or more for the "on" period and an equal or different number for the "off" period. By using a frequency of 120 cycles, it is possible to get a maximum of 3600 interruptions per minute; with a 240-cycle frequency the interruption can be increased to a maximum of 7200 per minute.

S S S

In forging gears to be shrunk on shafts, a manufacturer recently made several hundred gears in which the holes were slightly oversize. They were sent out to a plating establishment and the surfaces of the holes brought up to size by plating them with chromium. The cost of plating was about $3.50 for each gear, whereas the cost of replacing them would have been about $25 each.

S S S

TO OBTAIN full case hardness and maximum core toughness in carburized parts made from low-carbon steel, a Canadian metallurgist proposes the following treatment: Carburize; quench from the pot or cool in the pot and reheat to 1600 degrees Fahr. and quench. Reheat to 1360 degrees Fahr. and hold at temperature for about 5 minutes. Remove rapidly and place in a heating medium (liquid preferred) held at an elevated temperature. Hold for just sufficient time to permit the case to receive sufficient superheat to ensure full hardening on quenching. Quench in cold water or a more drastic medium.

S S S

In a middle western plant, a new pump casting, which weighed about 10 tons, had been prepared almost to the point where the pump was ready for assembly. After all of the machining had been finished a section which contained a bearing broke out from the casting, making it worthless for all practical purposes. As about $2000 had already been spent on it, the manufacturer did not care to lose the investment, therefore, upon recommendation of an oxyacetylene service operator, the casting was repaired by bronze welding using careful procedure. Inspection following cooling showed the bearings to be in correct alignment. The cost of the work was less than 10 per cent of the amount already invested in the casting.

New Books Worth Reading

SCIENCE ◆ ECONOMICS ◆ BUSINESS

How the Apprentice May Be Made or Marred

Apprenticeship, by Stewart Scrimshaw; cloth, 273 pages, 5¼ x 8 inches; published by McGraw-Hill Book Co. Inc.; supplied by STEEL, Cleveland, for $2.50 plus 15 cents postage and in Europe by Penton Publishing Co. Ltd., Caxton house, Westminster, London.

Increased interest in apprenticeship during recent years and the greater attention paid the teaching of vocational subjects in public schools provided an interesting background for this textbook on apprenticeship and co-operative part-time education. In studying the philosophy of apprenticeship relations, the author has reviewed the meaning of apprenticeship in its relation to modern industry, labor, the employer, formal education and the fluctuations of the state itself. Information is presented on new manifestations of apprenticeship in the form of co-operative training and problems encountered in the administration of the Wisconsin plan are presented as illustrations of principles and procedures which must be recognized if a thorough knowledge of industrial training is to be obtained.

In addition to holding the interest of vocational educators and educational and economics departments of colleges and universities, the book will be of value to personnel executives, company officers and leaders of labor organizations.

◆

Efficient Handling of Materials Is Discussed

Modern Materials Handling, by Simeon J. Koshkin; cloth, 488 pages 6 x 9 inches; published by John Wiley & Sons Inc.; supplied by STEEL, Cleveland, for $6, plus 15 cents postage, in Europe by Penton Publishing Co. Ltd., Caxton house, Westminster, London.

Remarkable progress made in the application of a wide variety of material handling equipment in practically every type of industry makes a work of this kind especially interesting and valuable. The book analyzes modern methods of handling various kinds of materials and deals with the principles and considerations involved in the proper selection of method.

The first chapter is devoted to general principles and classification of equipment, which, it is pointed out, are applicable in most instances, regardless of the size of the plant or the quantity of production, only the details of application differing. This is followed by detailed information on various types of cranes, overhead or monorail systems, industrial truck equipment, conveyor applications including gravity, belt, roller, chain, etc., speed reducers, skip hoists, screw conveyors, bucket and other types of elevators, and coal and ash handling equipment.

◆

Foundry Association Puts Proceedings in Book Form

Transactions of the American Foundrymen's Association, Vol. XXXVIII, 1930, edited by Robert E. Kennedy; cloth, 916 pages, 6 x 9 inches; published by the American Foundrymen's association, 222 West Adams street, Chicago, and supplied by STEEL, Penton building, Cleveland, for $8.00 plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton house, Westminster, London.

This book contains the report of the proceedings of the thirty-fourth annual convention of the society, proceedings of the annual banquet, reports of the various committees and executives and minutes of the meetings of the board of directors. The major portion is devoted to papers presented at the various sessions of the convention and reports of the joint committees with other societies. Discussions following presentation of the papers, both oral and written, are given. A report also is given of the session devoted to nonferrous foundry costs.

◆

Aluminum and its Alloys Under Heat Treatment

Heat Treatment and Annealing of Aluminum and its Alloys, by N. F. Budgen; cloth, 341 pages, 6 x 9½ inches; published by Chapman & Hall Ltd., London, Eng., and supplied by STEEL, Cleveland, and in London by Penton Publishing Co. Ltd., 416-17 Caxton house, Westminster.

While considerable information on the heat treatment and annealing of aluminum and its alloys has been published in technical literature and several textbooks on aluminum metallurgy contain chapters on those subjects, this is the first comprehensive book devoted to heat treatment and annealing of aluminum and its alloys.

The author, who is associated with William Mill's Aluminium Foundries, Birmingham, Eng., is eminently qualified to discuss the subject of heat treatment and annealing of aluminum and, while presenting the results of his own experiences, has not neglected to include data and results obtained by other investigators.

The book is divided into four parts with six appendices and an extensive bibliography. The first part deals with heat treatment of wrought pure commercial aluminum to increase strength and to soften or anneal. The second part presents information on heat treatment of cast pure commercial aluminum for increasing strength and to obtain softness. The third part is devoted to heat treatment of wrought aluminum alloys while the fourth describes the heat treatment of cast aluminum alloys.

Appendices deal with making of hardeners, influence of heat treatment on corrosion embrittlement, mechanical properties of aluminum and its alloys at elevated and low temperatures, effect of gas content, methods of marking heat treated aluminum, and aluminum bronze.

◆

Economics to Date; Text For Students and Others

Economics: Principles and Problems, by Lionel D. Edie; cloth, 859 pages, 6 x 9 inches; published by Thomas Y. Crowell Co. and supplied by STEEL, Cleveland, for $5.00 plus 15 cents postage, and in Europe by the Penton Publishing Co. Ltd., Caxton house, Westminster, London.

Many important changes in the field of economics during the past few years have necessitated such extensive revisions in this standard text that the second edition has become essentially a new work. The author has aimed not merely at bringing to date the statistical data but also in amending and clarifying the theory.

While the work is prepared primarily as a text book for the university student, the treatment is such that the book should find favor with a wide public. A better understanding of much of the subject matter is provided through the inclusion of 59 charts covering a wide variety of statistical information.

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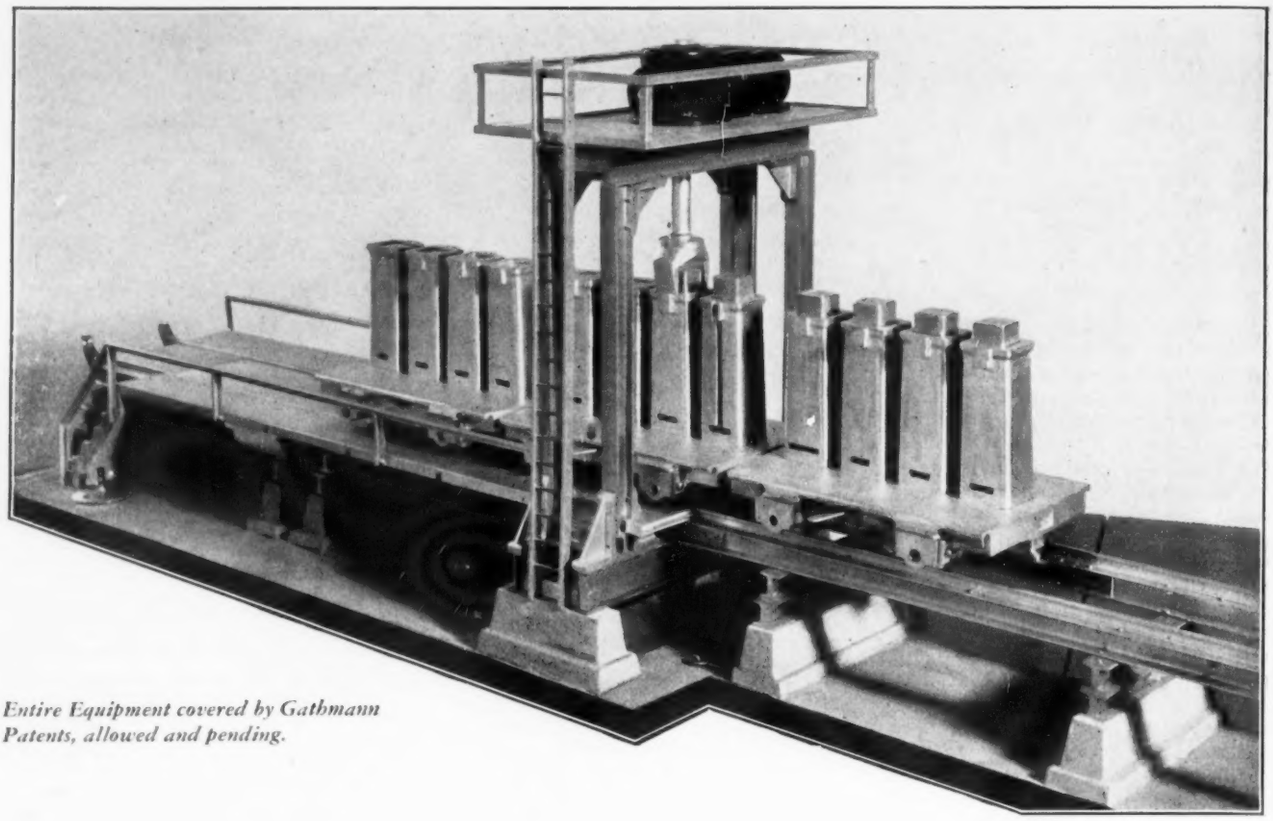

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There are no handling difficulties. Without the removal of molds from cars, the Gathmann Ingot Stripper accurately locates the mold to be stripped; automatically holds down the mold; automatically lifts the ingot, applying multiplied pressure in case of sticking; and automatically locks the ingot in a raised position, ready for removal. Transfer to the soaking pits is made with relatively low heat loss, as ingots are charged direct from molds into the pits by the standard soaking pit crane.

Not only does this device effect economies that abundantly justify its cost, but its operation is economical at anything from 10 to 100% capacity.

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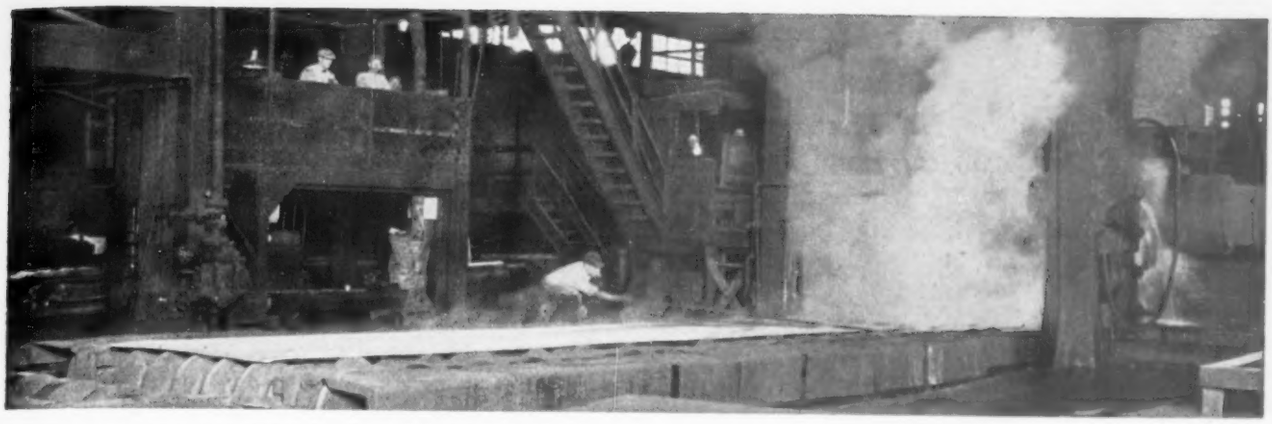
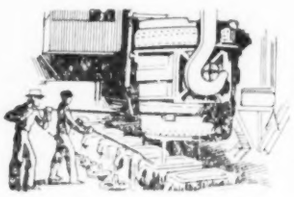


PROGRESS IN STEELMAKING

DIFFERENCES in the carbon content, hardness, the inclusions and carbide segregation, and laminations of strip steel are being determined on a commercial basis at a strip mill in this country by the use of an oscillograph which records the complete cycle of magnetization and indicates the mechanical or structural properties.



THIN skins on rimming ingots have been obviated by a simple means at a plant making this grade of steel. When the residual manganese in the bath before the final additions were made in the furnace exceeded 0.2 per cent, thin-skinned ingots resulted. The trouble was attributed to the high solvent power of the manganese in the crude iron over the hydrogen in the bath. By lowering the manganese content of the mixer metal to about 1.25 per cent, which afforded a residual manganese in the bath of about 0.10 per cent, ingots with a comparatively thick primary skin were obtained.

• • •

Extensive scientific investigation made by a Pittsburgh steel company has culminated in the development of a new type steel floor slab which provides maximum load-carrying efficiency of the welded sheets, permanent electrical flexibility and assurance against destruction by fire.

• • •

Recirculation of water in each spray zone of a new type washer for the primary scrubbing of blast furnace gas as it comes from the dust catcher has been effected. The method is revolutionary in gas washer design. A series of vanes inclined on the shell direct the sprayed water upward and into troughs suspended from the shell which return it to the sprayer, thus saving the power otherwise required for pumping.

• • •

Simultaneous rolling in the roughing and intermediate passes without interference is accomplished at a structural mill in the Chicago district by offsetting the two roll stands about 12 feet. The arrangement also affords conservation of space in the mill building.

• • •

Heavy-duty cutting steel in which molybdenum replaces tungsten to a large extent is a recently developed product of a Pittsburgh steelmaker. The new steel is about 91 per cent of the weight of commercial high-speed steel, and is being produced on a tonnage basis in the form of sheets, bars and forgings.

• • •

Refractory material of a new type having a coefficient of thermal expansion of only 0.0000027, is being marketed for high-temperature application. On account of its resistance to spalling the new material is suitable for door brick, lintels, door jambs, sill blocks and roofs of open-hearth and electric furnaces.

INSTALLATION of a new twin 500-pound acetylene gas generator station and oxygen manifold room, with all-welded pipe lines leading to different shops, has effected substantial savings at a western steel plant compared with the former tank system which required considerable labor in handling the equipment. The gas is used for welding and brazing cast iron, brass, copper and steel parts or spares that otherwise would be scrapped.

• • •

Internal strains imparted to steel steel sheets during roller leveling can be relieved, according to practice at one mill, by annealing at 110 degrees.

BASED on a complete open-hearth furnace campaign of about 300 heats recently made to present a comparison between steam and compressed natural gas atomization of by-product coal tar, no particular advantage results from gas and tar compared with steam and tar. An average of 4 per cent more total B.t.u. in the fuel was required for gas atomizing and because of the higher cost of these heat units, the total fuel cost was 30 per cent higher than when atomizing with steam. Production of waste-heat steam mounted in about direct proportion to the increase in total fuel. Heats made with gas-atomized tar were 40 per cent higher in fuel cost than when steam atomizing was used, based on a net fuel charge after a credit of waste-heat steam.

• • •

Increasing the life of the spindles driving a 24-inch bar mill five times has been accomplished by applying a ⅛-inch layer of wear-resisting alloy on each end and on both sides of the pad. Backlash in the gear box has been eliminated and the life of the reduction gears extended.

Scanning the Field of Technology

A Digest of Important Developments Pertaining to the Production, Processing, Application and Performance of Steel

Fatigue of Metals—Its Nature and Significance

By H. F. Moore, a paper presented at the annual meeting of the American Society of Mechanical Engineers in New York, Dec. 5-9, preprinted, 3 pages, 2 illusts.

The essential feature of fatigue failure in metals is a spreading crack. Studies of fatigue failure in single crystals of metal indicate that such cracks frequently start by slip along planes of atomic weakness. The study of fatigue failure of metals has shown certain limitations of the mathematical theory of elasticity when applied to actual nonhomogeneous metals. The importance of the ability of a metal to resist occasional slight plastic action without starting a fatigue crack is emphasized. The relation between atomic strength and the sterngth of a multigrained piece of metal is briefly discussed and a "crack-interference" hypothesis of fatigue failure suggested. The phenomenon of spreading cracks in metal under steady load at elevated temperatures is noted, and its significance discussed.

—STEEL, 12-19-32

Factors Influencing Choice Of Carburizing Equipment

By Elmer C. Cook, American Gas Furnace Co., in Machinery, October 1932, p. 132, 3½ pages.

The uniformity of case obtained on parts being carburized determines to a considerable degree the extent to which warpage in quenching may be avoided. This, in turn, determines the grinding tolerances. Thus, uniformity of case means less warpage and smaller grinding tolerances and this, in turn, means less grinding equipment and reduced cost of the product. It therefore follows that the more uniform the case of the carburized parts, the lower will be the cost of subsequent operations. Hence carburizing methods have a direct effect on manufacturing costs.

To duplicate with certainty the results obtained by that treatment can be done only by duplicating, as accurately as possible, all the conditions involved in the heat treating operations, including the time, the temperature, and the carburizing medium. If any one of these factors is varied, it will be reflected in the results obtained in the carburized surface. If work is not properly packed in boxes, a variation will be noted. The best process of carburizing is the one in which it is most convenient to duplicate, from day to day, certain definite factors.

—STEEL, 12-19-32

Cold Working Properties of Wire Reduced by Pearlite

By B. L. McCarthy, Wickwire Spencer Steel Co., in Metal Progress, December 1932, p. 19, 5 pages, 6 illusts.

Wire drawing technique has been developed by skilled artisans rather than by metallurgists; however, the metal itself demands definite processing along certain lines for the best results. The author confines his discussion to a study of the flow of the metal and some factors that influence it—notably as affected by the heat treatment, whether above or below the critical temperature. It is suggested that nonuniform flow in the metal is caused by lamellar pearlite, which offers resistance to plastic deformation. Two theories which have been advanced to account for the hardening effect of cold working are outlined as safe guides in the revision of wire-mill practice designed to produce higher quality wire at a lower price.

—STEEL, 12-19-32

Heat Transfer from Gas Stream to Broken Solids

By C. C. Furnas, bulletin 361 of the bureau of mines, Washington, obtainable from government printing office for 10 cents.

This study of heat transfer is part of an extensive program of research on the iron blast furnace which the bureau of mines is conducting in the laboratory and in the field. However, the transfer of heat from a gas stream to a bed of broken material is one of the most common industrial processes, taking place in every fuel bed, under boilers, in gas producers, or in water-gas generators. The increasingly important dry quenching of coke is one of the more obvious applications. Checker brick in furnace regenerators furnish an analogous field. Data presented in the bulletin do not cover all these possibilities, although a considerable range of materials, particle sizes, gas velocities and temperatures are included in the study.

Insofar as possible the data are presented in a general form so that they may be used for any type of system which is similar to the one studied. Experimental data have been interpreted to show that the coefficient of heat transfer from a gas stream to a bed of broken solids can best be expressed by an empirical equation which is set forth and explained.

—STEEL, 12-19-32

Hardness Not True Index to Wear Resistance of Iron

Inco, fall edition 1932, published by International Nickel Co. Inc., p 12, 1 page, 9 illusts., 1 table.

In recent years the theory that the wear resistance of cast iron was dependent upon the hardness of the material has given way to the knowledge that hardness is the key to wear resistance only when considered in connection with the body structure of the iron in question. Microscopic studies are reproduced of several representative types of plain and alloyed cast irons before and after mechanical wear tests were conducted to determine weight loss.

—STEEL, 12-19-32

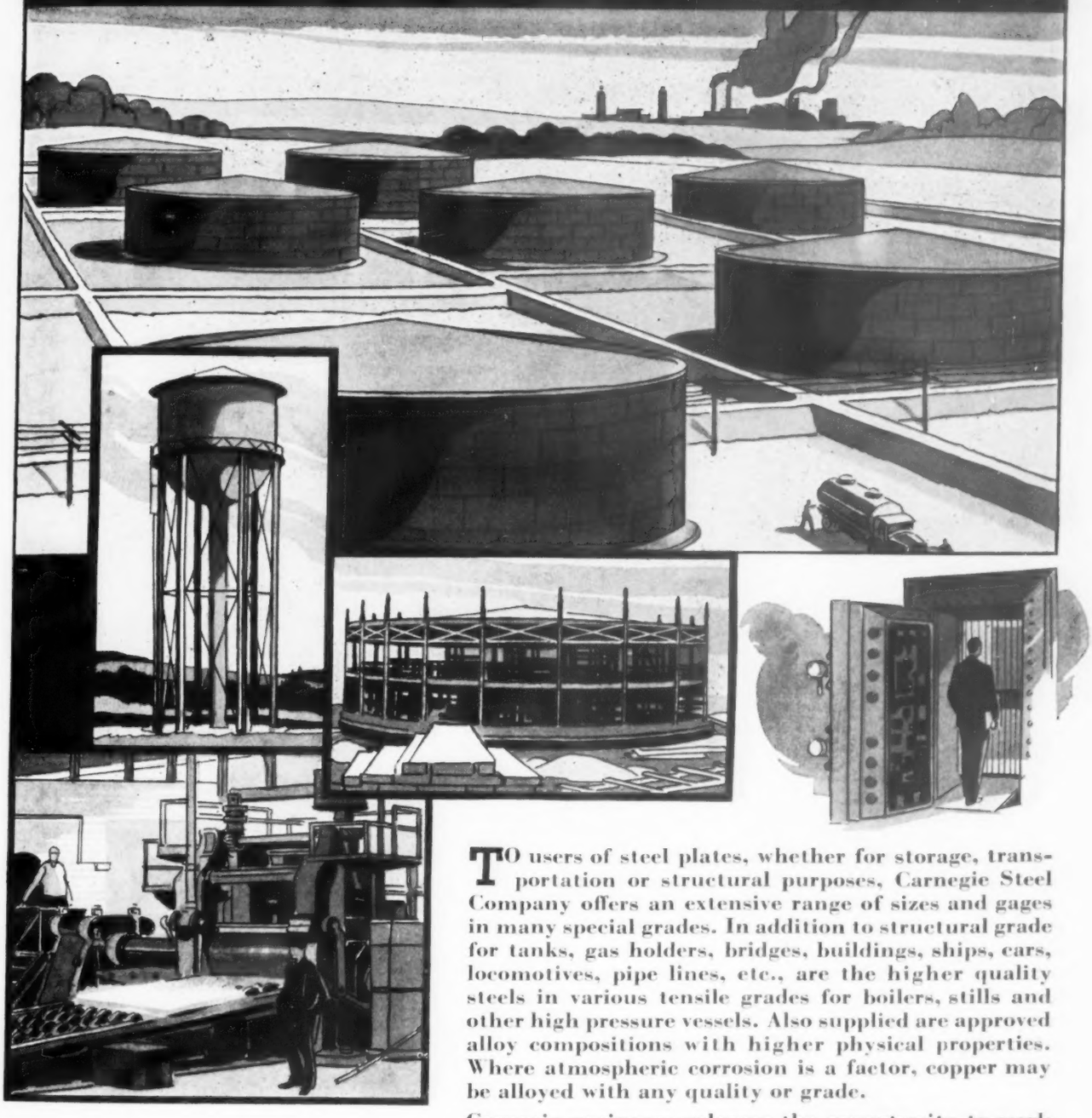
Unitization—the Sequence To Interchangeability

By Arthur H. Adams, in Machine Design, December 1932, p. 29, 4 pages, 3 illusts.

Unitization will be one of the watchwords of the future! The possibility of bringing out special models of machines or lines of new models without obsoleting previous designs is an ideal, yet it can be attained by combining interchangeable unitized mechanisms. Unitization is described as the extension of the 100 per cent interchangeability idea to functioning units; and means so designing any mechanism that it breaks into self-contained units, adjusted to operating as well as dimensional limits, such that a complete operative mechanism may be assembled of such units without selection or adjustment. Examples are given of the application of the unitization principle.

—STEEL, 12-19-32

STEEL PLATES *for* SAFE ... STORAGE



TO users of steel plates, whether for storage, transportation or structural purposes, Carnegie Steel Company offers an extensive range of sizes and gages in many special grades. In addition to structural grade for tanks, gas holders, bridges, buildings, ships, cars, locomotives, pipe lines, etc., are the higher quality steels in various tensile grades for boilers, stills and other high pressure vessels. Also supplied are approved alloy compositions with higher physical properties. Where atmospheric corrosion is a factor, copper may be alloyed with any quality or grade.

Carnegie engineers welcome the opportunity to work with you in determining the quality of material to most accurately and economically meet your needs.

CARNEGIE STEEL COMPANY • PITTSBURGH, PA.

Subsidiary of United States Steel Corporation

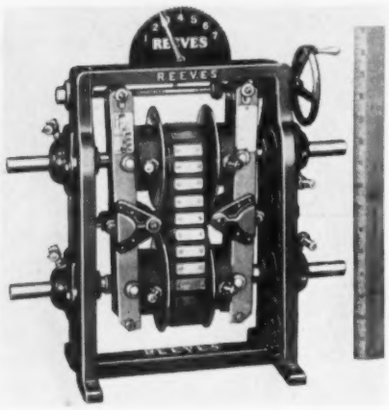
211

NEW EQUIPMENT

PRODUCTION FABRICATION TREATMENT FINISHING

Variable Speed Unit Is Small and Compact

Reeves Pulley Co., Columbus, Ind., announces the introduction of what is said to be the smallest vertical design variable speed transmission ever built. Designated No. 0000 and illustrated herewith, its extremely small size and compactness are apparent from comparison with the 15-inch ruler alongside. By use



Small variable speed transmission built by Reeves Pulley Co.

of this unit, valuable floor space may be conserved and limited space may be used to incorporate the transmission in upright position directly into a machine.

The unit may be equipped with motor base and individual driving motor, with auxiliary countershaft for greater speed reduction, and the extended lever type mechanical automatic control. It is also available in completely enclosed design for protection of operating parts against water, live steam, chemical fumes, dust and abrasives. Speed range is from 2:1 to 6:1 inclusive, and horsepower capacity from ⅛ to ¾.

◆

Ratchet Burring Reamer Has Spiral Flutes

Greenfield Tap & Die Corp., Greenfield, Mass., has introduced a ratchet burring reamer, designated No. 246-R, for removing burrs quickly and easily from the inside of pipe. This new tool is simple in design, yet it embodies several new features which insure easy cutting. The reamer has spiral flutes, which give it a shearing action (easy cutting), and at the same time feed it into the burrs, so that extreme pressure on the stock is unnecessary.

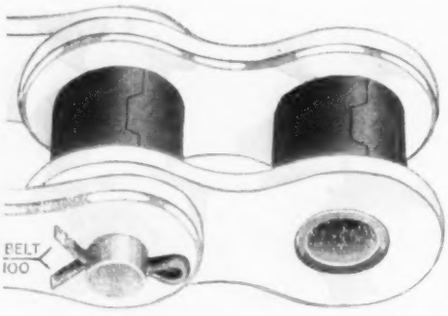
The ratchet head is completely enclosed, which keeps the moving parts free from dirt and burrs, and the polished tubular handle is light in weight and unbreakable. While designed primarily for removing burrs from pipe ¼ to 2-inches, it also can be used effectively for enlarging holes in sheet metal, countersinking, and for various other purposes.

◆

Roller Chain Treated to Resist Corrosion

Link-Belt Co., 519 North Holmes avenue, Indianapolis, has brought out a new roller chain with side bars especially treated to combat corrosion. This treatment gives them the appearance of silver. Silverlink roller chain, shown herewith, is made in all sizes from ⅜ to 2½-inch pitch, and in single or multiple widths. It is available with wheels for any horsepower, also with conveying attachment links in wide variety. Complete drives are stocked in sizes up to 225 horsepower, in speed ratios of from 1:1 to 8:1.

Construction features include: Side bars of alloy rolled steel heat treated for strength and toughness, and especially treated to resist corrosion; nickel steel case-hardened pins, detachable type with cotter or furnished



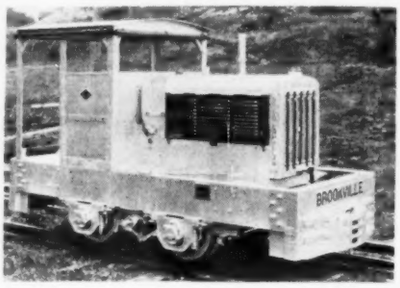
Silverlink roller chain recently developed by Link-Belt Co.

riveted; solid steel case-hardened bushings; and alloy steel heat treated rollers. The curled roller is made from strip steel having a strong fibrous structure, with the fibre running around instead of across the roller, so as to give the greatest strength and resilience to the roller, and offer the maximum resistance to shock. Uniformity and close clearances throughout assure accuracy of pitch and smooth chain operation.

◆

Standardizes Engines of New Industrial Locomotives

Caterpillar Tractor Co., Peoria, Ill., recently announced that its engines now are standard equipment on the



Brookville locomotive is powered by a Caterpillar engine

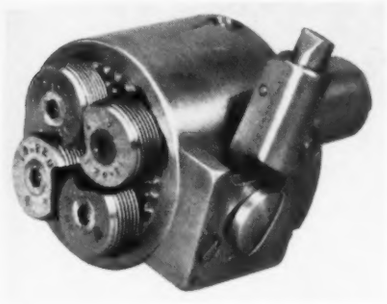
larger sizes of locomotives built by Brookville Locomotive Co., Brookville, Pa. The business arrangement insures prompt shipment of any size of locomotive from 6 to 12-ton, and guarantees engine service from Caterpillar dealers. A typical Brookville locomotive is shown in the accompanying illustration. Release of this information follows shortly after the announcement that the Bucyrus-Erie Co., South Milwaukee, Wis., is building its Loadmaster around the Caterpillar tractor.

◆

Introduces Self-Opening Die With Circular Chasers

National Acme Co., 170 East 131 street, Cleveland, recently introduced a self-opening die with circular chasers designated type DBS, and made to fit Brown & Sharpe automatics. The large mass of metal behind the cutting edge permits maximum cutting speeds as the heat created in thread cutting is more readily diffused.

These chasers, shown herewith, are reset and reground according to predetermined micrometer measurements in the tool room on chaser blocks that are used in the die head. This enables



Circular chaser die head introduced by National Acme Co.

the operator to put the chasers and blocks in the die head and start production immediately without adjustment for length, and without disturbing the cutting face location, the cutting edges being duplicated in the tool room. Constant threading production on the machine thus is permitted.

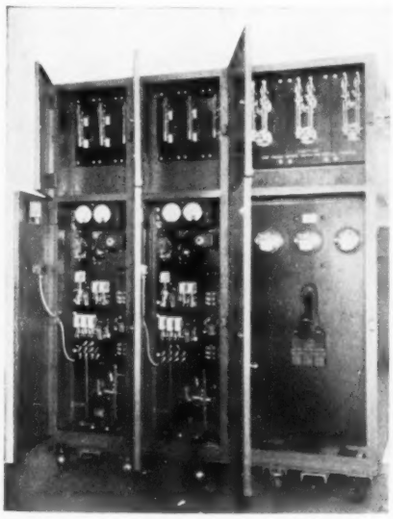
The new tool is so arranged that it is automatically closed just before the threading operation in the threading position. Compensation is provided in the shank to prepare against possible variation in tool slide travel due to cam wear. Minimum cutting diameter is 0.056-inch and chasers may be had in either the milled or ground thread. Ground thread chasers may be furnished to cut as fine as 80 threads per inch.

◆

Synchronous Motor Starter Protected from Dust

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., recently developed a synchronous motor starter, entirely enclosed in cubicles for protection against dust. In it are three compartments as shown herewith. One contains an incoming line circuit breaker with disconnect switches, while each of the others houses an individual synchronous motor starter with an electrically-operated breaker in addition to an individual disconnect switch.

Each compartment is provided with a lock to prevent unauthorized attention, and no operation can take place from without the cubicle except starting and stopping the motors, which is accomplished from a remote push button station. The individual motor generator exciters are controlled from the same push button that starts the synchronous motor.



Westinghouse cubicle starter for two synchronous motors

Ingersoll-Rand air-operated portable sump pump

◆

Develops Portable Air-Operated Sump Pump

Ingersoll-Rand Co., 11 Broadway, New York, has developed a new portable, air-operated sump pump shown in the illustration directly above. It consists of an open-impeller type centrifugal pump driven by a multivane type air motor and both enclosed in a one-piece housing. The unit weighs 50 pounds, and is designated as sump pump size 25.

Has Numerous Applications

Typical uses are pumping from sumps, trenches, manholes, caissons, cofferdams, tanks, bilges, etc. The pump will handle clear or dirty water, oil sewage, or moderately heavy sludge. Materials used are suited to the services and include bronze, stainless steel and rust-proof steel for installations that require them.

The pump is intended for lifts of 10 to 40 feet with air pressure of 70 to 90 pounds, but will give satisfactory results under widely varying conditions of head and air pressure. Using air at 80 pounds pressure, the capacity ranges from 170 gallons per minute with 10-foot lift through 20 feet of 2½-inch hose to 125 gallons per minute with 40-foot lift through 50 feet of 2½-inch hose. The pump is self-priming as it has no suction lift, and must be submerged to cover the inlet screen.

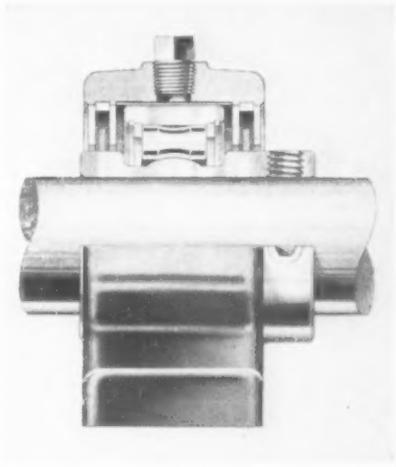
◆

Light-Duty Roller Bearings Are Self-Aligning

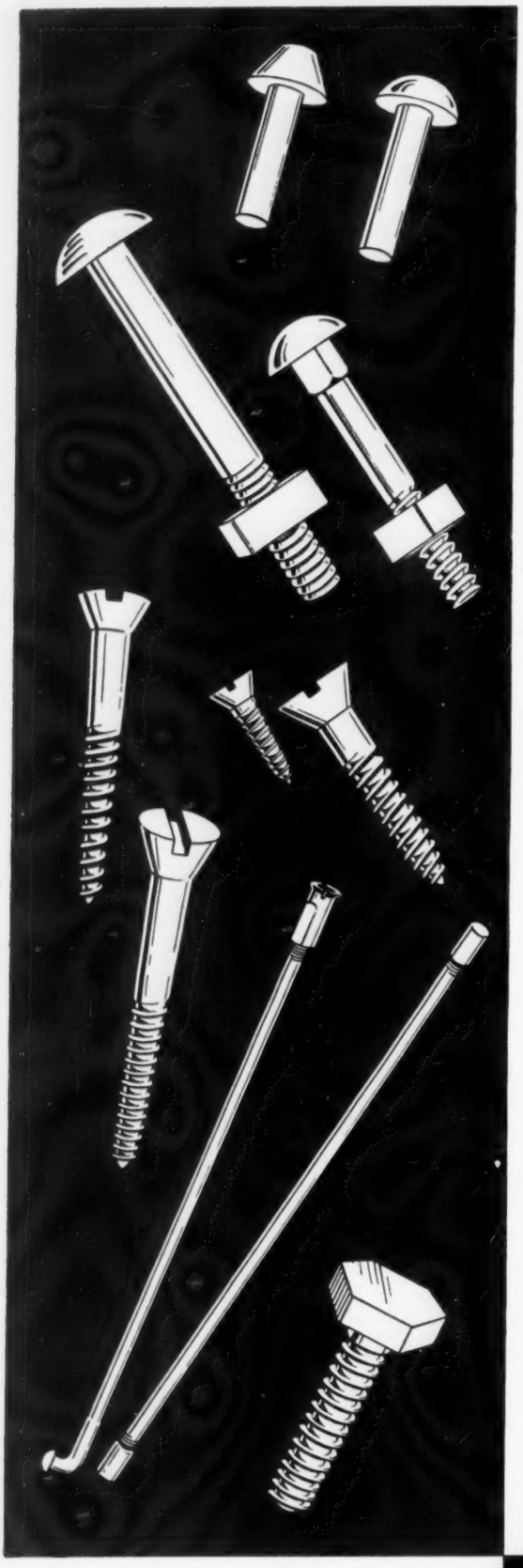
Shafer Bearing Corp., 621 South Kolmar avenue, Chicago, is offering a new line of single row, self-aligning roller bearings. A single row concave bearing is used with roller operating between a straight outer race and a convex inner race. This design assures sufficient radial load capacity with provision for the limited thrust capacity needed in applications having moderate loads.

Bearing of Full Roller Type

Self-alignment is obtained in the bearing itself, thus compensating for misalignment due to inaccuracies in machining or shaft deflection under load. The bearing is of the full roller type, a retainer being omitted. Thrust is taken by means of hardened and ground thrust plates. In addition to the pillow block shown herewith, the light duty bearings are available in flange units, hanger boxes and take-up units for shafts, from 9/16 to 2-3/16 inches inclusive.



Pillow block embodying Shafer self-aligning roller bearing



COLD HEADING *Wire*

Money cannot buy a finer cold heading wire than that now supplied by Republic to manufacturers of bolts, rivets, screws, spokes and similar products.

Uniformity is the keynote of Republic quality — uniformity of temper, of grain structure, of gauge. It is assured by direct supervision and control over every step in the manufacturing operation and makes possible quantity production of cold headed products with minimum loss.

Republic Cold Heading Wire is made in sizes 3/16 to 3/4-inch diameter, in all carbon and alloy specifications, bright, extra bright and coated finishes. Annealed or normalized wire can be furnished on request. Furnished in coils of 200 to 225 pounds or in smaller weight coils if desired.

Write the nearest Republic Sales Office for quotations, outlining your requirements.

REPUBLIC STEEL CORPORATION

GENERAL OFFICES YOUNGSTOWN, OHIO

Auto Needs Sustained, Easing Year-End Slide

Bookings of Some Makers Exceeding November—Cast Pipe Bought for Stock—Steel Rate Off to 14—Japan Heavy Buyer of Machine Tools

CUSHIONING the seascnal slide of the iron and steel markets into the holiday period are a number of encouraging developments, including sustained releases for automotive steel which for some producers will mount to a higher total than last month.

Railroads have released some rails; cities are placing cast iron pipe for stock; oil industry is inquiring better for tanks; pig iron shipments are holding up unexpectedly well; in some districts demand for coke exceeds November.

The drift in prcduction, however, continues downward, steel operations in the week ended Dec. 17 being off a point to 14 per cent. A further recession is indicated for this week, and next week the July 4 low of the depression, or 12 per cent, undoubtedly will be reached. Some plants will suspend from Dec. 24 to Jan. 3; one important mill to Feb. 1.

December assembly of automobiles is at a rate close to 100,000 units, probably 40 per cent in excess of November. January apparently will equal December, as Ford is releasing more material and parts for new models, Chevrolet is specifying at a rate indicating it will at least equal its 55,000 unit schedule for this month, such late starters on 1933 models as Pontiac, Olds, Hudson and Willys will assemble more cars next month than this.

Wheeling & Lake Erie railroad has released the remaining 50 freight cars, to an Ohio builder, of an earlier commitment for 100. New York Central has ordered out 7500 tons of rails, Illinois Central 2500 tcns, and the New Haven 1000 tons, while formal inquiry from the Santa Fe fcr 26,484 tons has been issued.

An R. F. C. lcan to San Diego, Calif., foreshadows purchase of 15,000 tons of cast iron pipe or the equivalent of steel pipe. New York has closed on 997 tons of cast pipe and Richmond, Va., on 800 tcns; bids are in on 730 tons for Schenectady, N. Y.; Boston will take tenders soon on 1200 tons. A survey is being made for a 300-mile gas line from northern Montana to Spokane.

Following the exceptional structural bookings of a week ago, awards this week have receded to 12,174 tons, slightly below the 1932 weekly average. A favorable decision is expected scon on a proposed observation tower for the Chicago fair, requiring 50,000 tons. Because the qualifications for an R. F. C. loan have been tightened measurably, the structural industry is lcsing hope of substantial support from this source.

Not only is more oil industry inquiry for tank work current at Cleveland, but a tank fabricator also notes $3,000,000 worth of business contingent upon legalization of beer. A Buffalo tankmaker has closed on $40,000 worth of brewery business. Tin plate production has eased off to 40 per cent despite further releases by the American Can Co. Argentina has placed 25,000 base boxes of tin plate abroad.

Chicago furnaces report the decline in pig iron shipments less pronounced than in the past two years, with an upturn expected in January. Radiator foundries are taking low phos iron at Pittsburgh. Both Pittsburgh and Chicago note good demand for coke, the latter a gain over November. Steel scrap has sold off to $5.50 at Chicago, only 50 cents above the summer low, while this grade at Pittsburgh has brought only $8.50 in two sales. STEEL's steelworks scrap composite is down 21 cents to $6.29.

A Japanese house has closed on 100 machine tools, including more than 50 milling machines, the bulk going to Cincinnati builders.

Basic iron and steel products being steady, STEEL's iron and steel composite at $28.91 and finished steel index at $46.70 are unchanged. Foreign manganese ore, however, is generally about 10 per cent lower, and cast iron pipe levels at Birmingham, Ala., are off about $1 per ton, with fittings reduced $10.

Composite Market Averages

	Dec. 17	Dec. 10	One Month Ago Nov., 1932	Three Months Ago Sept., 1932	One Year Ago Dec., 1931	Ten Years Ago Dec., 1922
Iron and Steel Composite	$28.91	$28.91	$29.12	$29.32	$30.32	$40.53
Finished Steel Composite	46.70	46.70	47.20	47.50	47.74	58.39
Steelworks Scrap Composite	6.29	6.50	6.87	7.04	8.16	17.28

Iron and Steel Composite:—Pig iron, billets, slabs, sheet bars, wire rods, tin plate, nails, sheets, plates, shapes, bars, and black pipe. Finished Steel Composite:—Plate, shapes, bars, hot strip, nails, tin plate, pipe. Steel Works Scrap Composite:—Melting steel, compressed sheets.

COMPARATIVE PRICES OF IRON, STEEL AND COKE

Representative Market Figures for Current Week, Last Month, Three Months and One Year Ago

	Dec. 16, 1932	Nov. 1932	Sept. 1932	Dec. 1931
Pig Iron				
Bessemer, del., Pittsburgh	$15.76	15.76	15.76	17.51
Basic, valley	14.00	14.00	14.00	15.00
Basic, eastern, del. eastern Pa.	13.50	13.50	13.75	16.00
No. 2 foundry, del. Pittsburgh	15.76	15.76	15.76	17.51
No. 2 foundry, Chicago	15.50	15.50	15.50	16.60
*Southern No. 2, Birmingham	11.00	11.00	11.00	12.00
**No. 2X, Virginia furnace	17.75	17.75	17.75	18.00
**No. 2X, Eastern, del., Phila.	13.76	13.95	14.26	16.01
Malleable, valley	14.50	14.50	14.50	16.10
Malleable, Chicago	15.50	15.50	15.50	16.60
Lake Superior charcoal, del. Chi.	23.04	23.04	23.04	20.79
Gray forge, del. Pittsburgh	15.63	15.63	15.63	16.88
Ferromanganese, del. Pittsburgh	73.24	73.24	73.24	84.79

*1.75-2.25 silicon. For local delivery. Northern shipments based on $10, Birmingham. **2.25-2.75 silicon.

Delivered pig iron prices subject to 10 per cent freight surcharge, maximum 13.44c per gross ton, beginning Jan. 4, 1932.

Coke				
Connellsville, furnace, ovens	1.75	1.80	2.00	2.30
Connellsville foundry, ovens	2.50	2.65	2.75	3.25
Semifinished Material				
Sheet bars, open-hearth, Youngs.	26.00	26.00	26.00	28.25
Sheet bars, open-hearth, Pitts.	26.00	26.00	26.00	28.00
Billets, open-hearth, Pittsburgh	26.00	26.00	26.00	29.00
Wire rods, Pittsburgh	37.00	37.00	37.00	35.00

	Dec. 16, 1932	Nov. 1932	Sept. 1932	Dec. 1931
Finished Material				
Steel bars, Pittsburgh	1.60	1.60	1.60	1.60
Steel bars, Chicago	1.70	1.70	1.70	1.60
Steel bars, Philadelphia	1.91	1.91	1.91	1.89
Iron bars, Chicago	1.65	1.65	1.65	1.60
Shapes, Pittsburgh	1.50	1.60	1.60	1.50
Shapes, Philadelphia	1.75	1.75	1.75	1.695
Shapes, Chicago	1.70	1.70	1.70	1.60
Tank plates, Pittsburgh	1.60	1.60	1.60	1.50
Tank plates, Philadelphia	1.74½	1.77	1.79½	1.735
Tank plates, Chicago	1.70	1.70	1.70	1.60
Sheets, No. 10 blue anneal., Pitts.	1.70	1.70	1.70	1.85
Sheets, No. 24, hot ann., Pitts.	2.10	2.10	2.10	2.40
Sheets, No. 24 galvan., Pitts.	2.85	2.85	2.75	2.90
Sheets, No. 10 blue anneal., Chi.	1.85	1.85	1.85	2.00
Sheets, No. 24 hot ann., Chi.	2.25	2.25	2.25	2.55
Sheets, No. 24 galvan., Chi.	2.90	2.90	2.90	3.05
Plain wire, Pittsburgh	2.20	2.20	2.20	2.20
Wire nails, Pittsburgh	1.95	1.95	1.95	1.95
Tin plate, per base box, Pitts.	4.25	4.50	4.75	4.75
Scrap				
Heavy melting steel, Pitts.	$8.50	9.15	9.50	10.25
Heavy melting steel, eastern Pa.	6.50	7.25	7.25	7.60
Heavy melting steel, Chicago	5.25	5.60	5.75	7.50
No. 1 wrought, eastern Pa.	6.50	7.25	7.25	9.50
No. 1 wrought, Chicago	5.00	5.00	5.00	7.45
Rails for rolling, Chicago	8.25	8.25	7.00	10.00

Sheets

Revival Expected in Automotive Releases—Public Buildings Providing Some Tonnage

SHEET PRICES, PAGE 45

Pittsburgh—Sheet steel specifications are declining, an inactive state of trade being forecast for the next three weeks. Sellers hope to enter some tonnage soon for rolling and shipment in January to automotive interests but have not received specifications. Black, blue annealed and galvanized sheets are being produced at less than 15 per cent of mill capacity for these grades, and full-finished at less. Prices are nominal. Black sheets still are quoted 2.10c to 2.20c.

Philadelphia—Moderate buying by two autobody manufacturers in this district is outstanding in an otherwise dull sheet market. Some tonnage for federal building work is pending, including sheets for the United States customs house here. Prices are unchanged although it is possible that a minimum of 2.20c, Pittsburgh, or 2.51c, Philadelphia, for black, may become effective in January.

Cleveland—Automotive requirements represent the only active feature of the sheet market at present, and they are tapering. Some mills are practically finished up on automotive specifications, though expecting additional releases immediately following the holidays. A few small inquiries for electrical sheets are pending. Federal building construction is developing some orders for galvanized sheets, and material for trim. Few contracts for sheets have been closed for first quarter, the reaffirmed prices for that period being untested.

New York—Sheet prices are unchanged and untested, sellers reporting business at the lowest ebb this year. Practically no contracting for next quarter is noted. Sellers plan to establish a firm minimum of 2.20c, Pittsburgh, on No. 24 hot rolled for delivery after Jan. 1.

Cincinnati—Only moderate demands for sheets have developed from automotive manufacturers, and other users are reducing specifications. Mills in this district are sympathetic to proposals initiated at Pittsburgh and Youngstown, O., for a downward revision of rail rates to Detroit.

Chicago—Sheet mill operations are spotty, business being insufficient to maintain schedules more than a few days at a time. Business is quieter than a month ago, and although some betterment is anticipated in January little interest now is being shown in future needs. Farm implement manufacturers are contributing only small lots, and specifications from most miscellaneous consumers are lighter.

St. Louis—Contracting for sheets for first quarter is in smaller volume than at any similar time in more than a decade. New orders are limited to small lots for prompt shipment.

San Francisco—For the Mare Island, Calif., navy yard approximately 85 tons of galvanized sheets have been divided between S. Weinstein Supply Co., New York, taking 65 tons at $3679.29, delivered; and 20 tons, American Rolling Mill Co., Middletown, O., at 2.55c, f.o.b. works. Alan Wood Steel Co., Conshohocken, Pa., booked 70,060 pounds of plates for Mare Island at $5521.95, delivered, on bids, Nov. 15.

Birmingham, Ala.—Sheet production has fallen off, and the only encouraging feature here is an expectation of some orders from barrel manufacturers.

Is Low on Bulkheads

Independent Bridge Co., Pittsburgh, submitted a bid of $1580 for fabricated structural steel for bulkheads for Dashields lock, Ohio river, for the Pittsburgh federal engineers. There were ten bidders, with figures as high as $2738.

CURRENT FINISHED STEEL PRICES

Delivered prices subject to freight surcharge corrected to nearest ½c. Asterisk denotes price change this week

Steel Sheets

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.55c
Gary, Ind. Harbor, base	1.65c
Chicago, delivered	1.70c
New York, delivered	1.90c
Birmingham, base	1.70c
Philadelphia, delivered	1.86c

BLUE ANNEALED NO. 9-10

Pittsburgh, base	1.70c
Chicago, district mills	1.80c
Chicago, delivered	1.85c
Philadelphia, delivered	2.01c
New York, delivered	2.05c
St. Louis, delivered	2.04c
Birmingham, base	1.85c
San Francisco c.i.f.	2.32½c

HOT ROLLED ANNEALED NO. 24

Pittsburgh, base	2.10c to 2.20c
Gary, Ind. Harbor, base	2.20c to 2.30c
Chicago, delivered	2.25c to 2.35c
New York, delivered	2.45c to 2.55c
Philadelphia, del.	2.41c to 2.51c
Birmingham, base	2.35c
St. Louis, delivered	2.54c
San Francisco, c.i.f.	2.85c
Detroit, delivered	2.28½c

GALVANIZED NO. 24

Pittsburgh, base	2.85c
Gary, Ind. Harbor, base	2.95c
Chicago, delivered	3.00c
Philadelphia, delivered	3.16c
New York, delivered	3.20c
Birmingham, base	3.00c
St. Louis, delivered	3.19c
San Francisco, c.i.f.	3.50c

AUTOBODY NO. 20

Pittsburgh, base	2.55c to 2.65c

FURNITURE

Pittsburgh, No. 10 heavy	2.40c to 2.50c
Pittsburgh, No. 20 light	2.90c to 3.00c

TIN MILL BLACK NO. 28

Pittsburgh, base	2.30c
Gary, base	2.40c
St. Louis, delivered	2.67½c

HEAVY COLD ROLLED NO. 10

Pittsburgh, base	2.00c
Gary, Ind. Harbor, base	2.10c
Chicago, delivered	2.15c
Philadelphia, delivered	2.31c
New York, delivered	2.35c

COLD ROLLED NO. 20

Pittsburgh, base	2.50c
Gary, Ind. Harbor, base	2.60c
Chicago, delivered	2.65c
Philadelphia, delivered	2.81c
New York, delivered	2.85c

Wire Products

(Prices apply on straight carloads. Mixed and joint carloads take 10 cents higher price; pool carloads 25-cent advance; less carloads 40-cent advance.)

F.o.b. mills, 100 lb. keg

Standard wire nails	$1.95
Cement coated nails	1.95
Galvanized nails	3.95

(Per pound)

Polished staples	2.65c
Galvanized staples	2.90c
Barbed wire, gal.	2.60c
Annealed fence wire	2.35c
Galvanized wire	2.80c
Woven wire fencing (9-11 gage)	$55.00
(12½ gage and lighter)	$60.00

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.20c
Spring wire	3.20c

Chicago and Anderson, Ind., $1 over Pitts.-Cleve.; Duluth and Worcester, $2 higher; Fairfield, Ala., $3 higher.

Steel Plates

Pittsburgh, base	1.60c
Philadelphia, del.	1.69½c to 1.79½c
New York, delivered	1.80c to 1.90c
Boston, delivered	1.92c to 2.02c
Buffalo, delivered	1.85½c
Chicago, base	1.70c
Cleveland, delivered	1.78½c
Birmingham, Ala. base	1.75c
Coatesville, Pa., base	1.60c to 1.70c
Pacific Coast, c.i.f.	2.00c
St. Louis, delivered	1.94c

Structural Shapes

Pittsburgh, base	1.50c to 1.60c
Philadelphia, delivered	1.75c
New York, delivered	1.87c
Boston, delivered	2.00½c
Chicago, base	1.70c
Cleveland, delivered	1.78½c
Lackawanna, N. Y., base	1.70c
Birmingham, Ala., base	1.75c
Pacific Coast, c.i.f.	2.10c
Do., wide flange	2.20c

Bars

SOFT STEEL

Pittsburgh, base	1.60c
Chicago, base	1.70c
Birmingham, Ala., base	1.75c
Lackawanna, N. Y., base	1.70c
Pacific Coast, c.i.f.	2.00c
Cleveland, base	1.65c
Philadelphia, delivered	1.91c
New York, delivered	1.95c
Boston, delivered	2.02c
Pittsburgh, cold finish	1.75c
Pittsburgh, forg. qual.	1.85c
San Francisco, c.i.f.	2.10c

RAIL STEEL

Chicago Heights	1.50c
Eastern mills	1.35c

IRON

Chicago, base	1.60c to 1.65c
New York, delivered	1.85c to 1.90c
Philadelphia, delivered	1.81c to 1.86c
Pittsburgh, refined	2.70c to 4.20c

REINFORCING

Pitts., billet cut lengths	1.65c to 1.75c
Pitts., stock lengths, mill	1.50c to 1.60c
Chicago, billet	1.50c to 1.60c
Chicago, rail steel	1.20c to 1.30c
Philadelphia, cut lengths	1.86c
Cleveland, cut lengths	1.75c

Cold-Finished Bars, Shafting

Base, Pittsburgh

10,000 to 19,999 pounds	1.70c
20,000 to 59,999 pounds	1.65c
60,000 to 99,999 pounds	1.60c
100,000 pounds and over	1.57½c

Chicago, Cleveland, Buffalo 5c higher; Detroit, 20c; eastern Michigan 25c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel Sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot Strip	19c	20.5c	23c	28c
Cold Strip	25c	26.5c	29c	34c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Tin and Terne Plate

Per 100-pound box, Pittsburgh

Tin plate, coke base, cont.	$4.25
Tin plate, coke base, stock	3.75
Long ternes, 24, unassorted	2.80

Gary, Ind., base 10 cents higher

Alloy Steel

Hot Rolled—F.o.b. Pittsburgh, Buffalo, Chicago and Massillon, O.

Hot rolled; base 2.45c to 2.65c, mills; differentials to various consumers

S.A.E.	Alloy Diff.	4600 .20 to .30 Mo.	1.25-1.75 Ni. 1.05
2000	0.25	5100 .80 - 1.10	
2100	0.55	Cr.	0.45
2300	1.50	5100 Cr.	
2500	2.25	spring	0.20
3100	0.55	6100 bars	1.20
3200	1.35	6100 Spring	0.95
3300	3.30	Cr., Ni., Van.	1.50
3400	3.20	Carbon van.	0.95
4100 .15 to .25 Mo	0.50	9250 (flats)	0.25
		9250 (rds., sq.)	0.50

Strip, Hoops, Bands

Hot-rolled strip up to 23 15/16 in. wide Pitts.	1.45c
Do., Chicago	1.55c
Do., del. Philadelphia	1.76c to 1.81c
Do., del. New York	1.80c to 1.85c
Cooperage hoop, Pitts.	1.55c to 1.60c
Do., Chicago	1.65c to 1.70c
Cold-roll, strip, Pitts., Cleve.	2.00c
Worcester, 3 tons or over	2.20c

Rivets, Wrought Washers

Struc., c.l., Pitts-Cleve.	2.25c
Struc., c.l., Chicago	2.35c
7/16-in. and smaller, Pitts., Chicago, Cleveland	70, 10 and 5 off
Washers, c.l., Pitts. dist.	$6.50 to 6.75 off
Do., Chicago district	7.00 to 7.50 off

Rails, Track Material

Standard rails, mill	$40.00
Relay rails, Pitts, 20 to 45 lbs.	$21.00 to 23.00
50 to 75	18.00 to 20.00
80 to 100	23.00 to 25.00
Light rails, 25-45, mills	$30.00
Light rails, Chicago	$32.00
Angle bars, mills	2.55
Spikes, railroad, mills	2.40c
Spikes, boat, barge, Pitts.	2.65c
Track bolts, Chicago	3.50c
do., standard, jobbers	73 off list
Tie plates, Pitts.	$35.00
Tie plates, Chicago	$35.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chi. Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread ..... 75 off
Rolled thread ⅜ x 6 and smaller take 10 per cent lower list.
Eagle list ..... 75 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts ..... 75 off
Tire bolts ..... 60 and 10 off
Stove bolts, 77½, 25 and 10 off in pkgs.; 86 off in bulk.
Rolled thread machine bolts, ⅜ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished ..... 75 off

HEXAGON CAP SCREWS

Milled ..... 80-25 off
Upset 1 in. diam. and smaller 80-25-10 off

SQUARE HEAD SET SCREWS

Upset, 1 in. and smaller ..... 75-10-10 off
Headless set screws ..... 75-10 off
Upset, larger than 1 in. ..... 75-10 off

Cut Nails, Chain, Piling

Cut nails, c.l. Pittsburgh	$2.50
Do., less carloads, 5 kegs or over	$2.90
Less than 5 kegs	$3.05
Steel sheet piling, Pitts.	1.90c

Bars

Slow Demand Holds Output to Small Proportions—Little Sign Of Immediate Upturn

BAR PRICES, PAGE 45

Chicago—Automotive specifications for soft steel and alloy bars are well maintained in contrast to the declining trend in demand from most other consumers. Orders from farm implement manufacturers are slightly heavier, but tonnages involved are light. Additional moderation is anticipated over the remainder of the month, with a seasonal upturn in prospect for January. Forward bookings, however, still are light, most orders being for prompt shipment. The market generally holds at 1.70c, Chicago. Bar iron is quieter, the current 1.60c to 1.65c price being continued into first quarter.

Philadelphia—Five hundred tons of bars for cruiser No. 39, on which the Bethlehem Shipbuilding Co. is low, continues of interest in the bar market here. Sellers generally have reaffirmed 1.60c, Pittsburgh, for next quarter.

Pittsburgh — Even fair-sized groupings of bar orders are difficult to obtain in the present market, and mill operations suffer from frequent roll changes on the spotty character of present orders. The exception appears to be in alloy bars which, due to automotive buying, have been fairly well sustained through this month at a rate better than in November. The same may be said of forging bars. A Valley mill will share equally with a Cleveland mill in some 1400 tons of reinforcing bars for a Cleveland project. Merchant steel bars appear fairly firm at 1.60c, Pittsburgh, and alloy bars are based on 2.45c to 2.65c, mill.

Cleveland—Additional orders for bars for first quarter delivery are expected from some of the automobile builders before the close of the year. Miscellaneous orders from railroads in the past week were better than in several preceding weeks. Some makers have booked from various sources contingent orders for first quarter, users being uncertain as to what they will specify. Viewing the first quarter, a few producers do not see tonnage of such size as might expose prices to severe strain, present steel price levels, they believe, could give way in the face of unusual tonnage. The current market for commercial steel bars is 1.65c, base, Cleveland.

Mesta Machine Co., Pittsburgh, has declared an unchanged dividend of 25 cents a share on the common and $1.50 on the preferred stock, both payable Jan. 1 to record of Dec. 16.

Tin Plate Contracting Slow; Market Is Firm

Tin Plate Prices, Page 45

Pittsburgh—Tin mills will do no better than an average of 40 per cent in operations this week. Much of the output will be stocked. Contracts for 1933 are slow, though investigation shows the price of $4.25 per base box, is the firmest on tin plate in many years. Tin mill black is quoted 3.20c, Pittsburgh, and long ternes, 2.80c. Bids on 17,342 sheets of tin plate close Dec. 22 for the Edgewood, Md., arsenal. Bids are in on 10,000 sheets of long terne plate for the Frankford, Pa., arsenal.

New York—The leading canmaker has released further specifications. This follows action early last fall in releasing 1,000,000 base boxes for next year's shipment. The Argentine oil fields have closed on 25,000 base boxes abroad, presumably with German makers.

Cold-Finished Steady, But Specifications Slow

Cold Finished Prices, Page 45

Pittsburgh — Cold-finished bar users are not interested in first quarter and mills have had no specifications for that time other than a few understood blanket orders which always prevail. Curtailment on the part of jobbers in handling their stock is especially noted. In fact, restrictions in most customers' plants will establish December as nearing the low point in shipments. The base price of 1.70c, Pittsburgh, has not only been reaffirmed but it also is a firm market currently.

Plates

Cruiser Requiring 7300 Tons Expected to Be Awarded—More Figuring on Brewery Tanks

PLATE PRICES, PAGE 45

Chicago—Pending work in fabricated plates is slow to close, and orders are in unchanged volume. Railroad and tank specifications are light. The 1.70c, Chicago, price is receiving but little test.

Pittsburgh—Pittsburgh plate interests have been asked to figure on over 700 tons for 77 buoy bodies for the Staten Island, N. Y., superintendent of lighthouses, bids to go in Jan. 3. The 12 steel cargo barges, requiring some 3000 tons of plates, which the Marietta Mfg. Co. is building will be used for Ohio river transportation below Cincinnati. Vang Construction Co., Pittsburgh, has purchased a 110-ton steel barge from the American Bridge Co., Pittsburgh. Plates generally are 1.60c, Pittsburgh.

Boston—Plate demand is light with prices easy. A Cambridge, Mass., boiler shop is fairly active on gas truck body tanks. A Maine shipyard, low bidder on a tow boat, will buy about 125 tons. There has been some gain in operations for several Springfield district consumers.

New York—Rustless Iron Corp., Baltimore, has been awarded 119,402 pounds of corrosion resisting steel plates for delivery at Washington, at $32,835.55. These are chrome-nickel plates, 0.375-inch thick, including 68 plates, 66½ x 207 inches, and 32 plates, 66½ x 88 inches. They are for the manufacture of quadruple torpedo tubes for destroyers.

Philadelphia — Bethlehem Shipbuilding Co., Quincy, Mass., low bidder, is expected to be awarded cruiser No. 39, requiring 7300 tons, of which 3500 tons will be hull steel and 1800 tons special armor plate. The company's bid was $8,196,000, United Dry Docks Inc., New York, bid $9,525,000; New York Shipbuilding Co., Camden, N. J., $9,616,000; and Newport News Shipbuilding & Dry Dock Co., Newport News, Va., $9,650,000. Plate demand is light, most makers indicating their intention of quoting 1.70c, Coatesville, on carlots for next quarter. Meanwhile, a spread of 1.60c to 1.70c, Coatesville, prevails on the usual run of business.

Cleveland—About 250 to 300 tons

of plates are on inquiry for oil stills, taking material 1½ up to 4 inches thick. Demand from the oil industry as reflected here is better than in some months. Inquiries also have come out from boiler manufacturers; one from a local fabricator on an order in hand being the first from this source in several months. Potentially, at least, the market has a brighter outlook, though current miscellaneous orders are few and small. Continued interest is being displayed in beer tank fabrication, and reports indicate some good tonnages for tank orders have been placed in nearby districts. An inquiry is out for stainless-steel clad plates for such tanks. One fabricator is understood to have contingent orders for approximately $3,000,000 worth of tanks. Expectations of business in this field are such that some fabricators are considering installing special equipment. The general market for plates continues steady at 1.60c, base, Pittsburgh.

Contracts Placed

450 tons, 426 buoys, lighthouse bureau, Staten Island, N. Y. Low bidders: Biggs Boiler Works Co., Akron, O.; R. D. Cole Mfg. Co., Newman, Ga.; Bressler Sheet Metal Works, Lebanon, Pa.; Heine Boiler Co., Phoenixville, Pa.; Pulaski Engineering Works Inc., Pulaski, Va.; Marion Machine Supply Co., Marion, Ind. Recommendations for award made to Washington, bids Nov. 21. Whiting Corp., Chicago, and Mobile Stove & Foundry Co., Mobile, Ala., low on several hundred tons of cast iron sinkers and balls.

110 tons, barge for Vang Construction Co., Pittsburgh, to American Bridge Co., Pittsburgh.

Contracts Pending

450 tons, penstocks and discharge pipe, irrigation project, Wapato, Wash.; Beall Pipe & Tank Co., Portland, Ore., low for penstocks: Valley Iron Works, Yakima, Wash., low for steel pipe.

450 tons, pipe extension, Vancouver, B. C., bids Jan. 4, by E. A. Cleveland, chief commissioner, Vancouver, B. C.

350 tons, 77 large buoy bodies, light house bureau, Staten Island, N. Y.; bids Jan. 3.

275 tons, caisson for dry dock, navy yard, Norfolk, Va.; Dravo Contracting Co., Pittsburgh, low, $44,800; bids Dec. 14.

200 tons, third class special nun and can buoys, lighthouse bureau, Staten Island, N. Y., bids Dec. 20. Included, 100 tons of castings.

200 tons, four 100-horsepower boilers for Mare Island, Calif. Bids on Specification 7119, Dec. 21 in Washington.

100 tons, steel tank and tower, bureau of yards and docks, Corry Field, Pensacola, Fla.; bids Dec. 28.

Railroads

Illinois Central Places 2500 Tons Rails, N. Y. C. Releases 7500—W. L. E. Buys 50 Cars

TRACK MATERIAL PRICES, PAGE 45

Chicago—Releases of small rail tonnages feature an extremely quiet market for railroad material. Illinois Central has placed 2500 tons with local producers, while the New York Central has released about 7500 tons against orders, in addition to 6000 tons released in November. Other roads are slow to make commitments for track material and other steel products, preferring to wait until such material is urgently needed. Specifications for steel products for car repair work reflect light operations at car shops, while the car and locomotive markets remain quiet.

Railroads have proposed an extension of the 10 per cent reduction currently prevailing until July 31, 1933, during which period no attempt would be made through the railroad mediation board for a 20 per cent basic pay reduction which the carriers hoped to obtain. The present scale expires Feb. 1, 1933. At a conference of railroad managers and employes here it was stipulated in connection with this proposal that after July the 10 per cent reduction be continued indefinitely.

New York — New York Central will open bids under the Clayton act on its next quarterly requirements of plates, shapes and bars, Dec. 29. Seaboard Air Line, and Atlantic Coast Line are also in the market for regular needs.

New York Central is closing Dec. 29 on steel wheels covering part of first half requirements.

Cleveland—Wheeling & Lake Erie railroad has placed an order for fifty 70-ton new type steel gondolas with the Canton Car Co., Canton, O. Miscellaneous orders from railroads are restricted to repair material, with volume lighter than in recent weeks. Railroads' inquiry blanks for prices for first quarter have been sent in by steelmakers, it is understood, with current levels reaffirmed.

Pittsburgh—The Edgar Thomson rail mill of the Carnegie Steel Co. began rolling Dec. 14 and will continue to operate into this week. The backlog of orders is at best under 10,000 tons and part of this is for stock. Several railroad inquiries for boiler tubes and bar, plate and shape needs for first quarter 1933, have been in the market. One railroad in the East is inquiring for its boiler tube requirements for the entire year of 1933. Tie plates are asked at $35 a ton, standard open-hearth rails $40 a ton, and spikes 2.40c per 100 pounds.

Car Orders Placed

Wheeling & Lake Erie, 50 steel gondolas, 70-ton capacity, to Canton Car Co., Canton, O.

Rail Orders Placed

Illinois Central, 1500 tons to Illinois Steel Co., 1000 tons to Inland Steel Co.

New York Central, 7500 tons rails released on old order with several mills.

New York, New Haven & Hartford, 1006 tons rails released to Carnegie Steel Co. on old order.

Rail Orders Pending

Atchison, Topeka & Santa Fe, 26,484 tons, rails, inquiry issued.

United States army engineer, Portland, Oreg., 715 tons for Yaquina, Oreg., jetty project, bids Dec. 27.

Bolt, Nut Buying Slow; First Quarter Is Covered

Bolt, Nut, Rivet Prices, Page 45

Pittsburgh—Bolt orders were in smaller volume last week and demand for rivets continues light. Prices are fairly stable at 75 off list for bolts and nuts and base of 2.25c for rivets in small quantities.

New York—Buffalo Bolt Co. and Columbus Bolt Works Co. took most of the bolt and nut contract for the navy, under schedule 8826, the former with a total of approximately $6608 and the latter at subject to specification.

Cleveland—Nut, bolt and rivet manufacturers expect to finish up this month with volume as good as in November. Automotive demand still is good and railroads fair, with jobber business falling off. Contracts for first quarter are being signed.

Chicago—A slight increase in operations of some manufacturers of farm equipment is resulting in some additional orders for bolts and nuts. Specifications from jobbers and from most other consumers continue light. Forward contracting largely is completed, at 75 off for bolts and nuts, and 2.35c, Chicago, for structural rivets. List prices on small carriage and machine bolts are being revised.

Structural Shapes

Inquiry at New York and Chicago Heavier — Week's Awards in Lighter Volume —Successful Financing of 50,000-Ton World Exposition Tower Expected

STRUCTURAL SHAPE PRICES, PAGE 45

New York—Structural awards are light, although 2300 tons have been placed for a state hospital. Pending inquiry, however, is heavier, led by railroad, federal and state requirements. Several eastern railroads, including the New York Central, are taking bids for first quarter. Several thousand tons pend for state bridges in New York and New Jersey.

Boston—Structural awards have slumped, but include two bridges, taking close to 250 tons. Prices on both plain and fabricated material are easy.

Philadelphia—The award of 8000 tons for the Archives building, Washington, as reported last week, went to McClintic-Marshall Corp., Bethlehem, Pa., while a contract for 2000 tons for the Norfolk, Va., postoffice has gone to the Fort Pitt Bridge Co. No action has been taken on the 2300-ton naval hospital here. Miscellaneous bridge work is fair. Inspection of 18,500 tons of steel for the Philadelphia postoffice, fabricated by the American Bridge Co., will be by James G. Dempsey, Philadelphia.

Pittsburgh—Rust Engineering Co., Pittsburgh, has taken the general contract on the central heating plant at Washington to require 1500 tons. Shapes are moving slowly for private projects, with the price on small lots 1.60c, Pittsburgh.

Chicago—New structural inquiry involving larger lots totals around 5000 tons, including 2400 tons for Illinois and Indiana highway bridges, 1500 tons for Denver & Rio Grande Western railroad bridges, and 1000 tons for a Detroit incinerator plant. For the Omaha, Nebr., postoffice 1000 tons have been placed.

A favorable completion of plans for financing an observation tower at the Century of Progress exposition here, to require 50,000 tons of shapes, is expected this week.

Cleveland—Bids are to be opened by the state department of highways Dec. 23 and Jan. 3 on several bridges, among which is the Shelby county span, requiring 225 tons of shapes. A Detroit fabricator has booked 350 tons for a bridge at Port Clinton, O., and a general contractor at Detroit is placing 275 tons for a postoffice at Springfield, O., and 240 tons for a postoffice at New Castle, Pa.

Contracts Placed

8000 tons, Archives building, Washington, to McClintic-Marshall Corp., Bethlehem, Pa.; reported last week to unstated fabricator.

2300 tons, buildings, state hospital, Kings Park, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.; Seglin Construction Co., New York, general contractor.

2000 tons, postoffice, Norfolk, Va., to Fort Pitt Bridge Co., Pittsburgh; Consolidated Engineering Co., Baltimore, general contractor.

1000 tons, Omaha, Nebr., postoffice, to Wisconsin Bridge & Iron Co., Milwaukee; J. P. Cullen & Sons, Janesville, Wis., general contractor.

735 tons, highway bridge, Holly, Colo., to McClintic-Marshall Corp., Bethlehem, Pa.

700 tons, state bridge, Bonner's Ferry, Idaho, to Columbia Steel Co., San Francisco; Puget Construction Co., Seattle, general contractor.

615 tons, highway bridges in Waco, McLennon, Caldwell and Guadalupe counties, Texas, to Virginia Bridge & Iron Co., Roanoke, Va.

350 tons, bridge, Flat Rock, Mich., to Lackawanna Steel Construction Corp., Buffalo.

350 tons, bascule bridge, Port Clinton, O., to R. C. Mahon Co., Detroit.

305 tons, postoffice, Merced, Calif., to Minneapolis-Moline Power Implement Co., Minneapolis; North-Moller Co., Jackson, Mich., contractor. Reported last week as 100 tons or more.

270 tons, bridges, Nebraska, to Omaha Steel Works, Omaha, Nebr.

250 tons, postoffice and courthouse, Alexandria, La., to Petroleum Iron Works, Beaumont, Tex.; Algernon Blair, Montgomery, Ala., general contractor.

250 tons, packing plant, Madison, Wis., to Lakeside Bridge & Steel Co., Milwaukee.

250 tons, storage bins, National Sugar Refining Co., Long Island City, N. Y., to National Bridge Works, same city.

240 tons, state bridge, York county, Pennsylvania, to unnamed fabricator.

230 tons, Pennsylvania railroad bridge, Merchantville, N. J., to Phoenix Bridge Co.

205 tons, highway bridge, Nebraska, Pa., to McClintic-Marshall Corp., Bethlehem, Pa.

200 tons, shapes and bars, postoffice, Mt. Vernon, O., to Mt. Vernon Bridge Co., same city.

190 tons, buildings at Government Island, Calif., to Herrick Iron Works, Oakland, Calif.

180 tons, bridge at Fonda, N. Y., to Lackawanna Steel Construction Corp., Buffalo.

170 tons, highway bridge, Pennsylvania, to McClintic-Marshall Corp., Bethlehem, Pa.; through Ortale Construction Co., Pittsburgh.

168 tons, bridges, Ola-Hot Springs road, Perry county, Oklahoma, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

150 tons, highway bridge, Johnson county, Oklahoma, to Capitol Steel & Iron Co., Oklahoma City, Okla.

150 tons, highway bridges, Tooele county, Utah, to Minneapolis-Moline Power Implement Co., Minneapolis.

135 tons, bin hopper, Co-operative G.L.F. Mills Inc., Albany, N. Y., to Lackawanna Steel Construction Corp., Buffalo; Indiana Engineering & Construction Co., Fort Wayne, Ind., general contractor.

130 tons, state bridge over Boston & Maine railroad, Beach street, Revere, Mass., to New England Structural Co., Boston; Coleman Bros. Inc., Boston, general contractor.

125 tons, furnace retorts, Atchison, Topeka & Santa Fe railroad, to American Bridge Co., Pittsburgh.

115 tons, hospital, Greenwich, Conn., to Montgomery Iron & Steel Co., Philadelphia.

111 tons, state bridge, Springfield, Vt., to McClintic-Marshall Corp., Bethlehem, Pa.; Kittridge Bridge Co., Concord, N. H., general contractor. Concrete Steel Co., New York, awarded 35 tons of reinforcing bars.

100 tons, bridge over Rocky Fork creek, Mansfield, O., to American Bridge Co., Pittsburgh.

100 tons, highway structures, Buffalo-Millersport, Erie county, New York, to McClintic-Marshall Corp., Bethlehem, Pa., through Roadway Trucking Corp., Williamsville, N. Y.

100 tons, highway bridge, Eau Claire, Wis., to Wausau Iron Works, Wausau, Wis.

100 tons, highway bridges, Osage county, Oklahoma, to Capitol Steel & Iron Co., Oklahoma City, Okla.

Awards Compared

	Tons
Awards, week ended Dec. 17	**12,174**
Awards, week ended Dec. 10	**34,597**
Awards, week ended Dec. 3	**11,448**
Awards, this week in 1931	**8,760**
Av. weekly awards, 1931	**34,236**
Av. weekly awards, 1932	**16,384**
Av. weekly awards, Nov.	**11,468**
Awards to date, 1931	**1,725,983**
Awards to date, 1932	**835,684**

Contracts Pending

2500 tons, central heating plant, Washington; Rust Engineering Co., Pittsburgh, low on general contract.

2500 tons, state homeopathic hospital, Gowanda, N. Y.; bids Dec. 22.

2175 tons, superstructures, double leaf span and three flanking spans, Hackensack river, Rutherford-Secaucus, N. J., readvertised for Dec. 28. Bids of Oct. 17 rejected. Work also includes 190 tons of trunnions and machinery.

2000 tons, shapes, plates and bars, first quarter, New York Central railroad; bids Dec. 27.

1500 tons, main and other buildings, United States narcotic farm, Lexington, Ky.; bids Jan. 12.

1500 tons, bridges for Denver & Rio Grande Western railroad.

1400 tons, highway bridges, Illinois; bids Dec. 23.

1100 tons, viaduct, New York Cen-

tral railroad, Banks and Bethune streets, New York.
1075 tons, two bridges for the Pennsylvania highway department, bids opened Dec. 22; one bridge will be located in Lycoming county, and requires 600 tons, while the other will be located in Susquehanna county and will require 475 tons.
1000 tons, addition to postoffice, San Francisco; bids Dec. 28.
1000 tons, including 750 tons of steel sheet piling, lock and dam No. 1, Barren river, Green Castle, Ky.; bids soon to United States engineer, Louisville, Ky. Work also includes 65 tons of reinforcing bars, 130 tons of steel forgings, and 13 tons of iron castings.
1000 tons, highway bridges, Indiana; bids Dec. 20.
1000 tons, incinerator plant, Detroit.
956 tons, Marked Tree floodway bridge for state, Poinsett county, Arkansas; bids Dec. 15.
742 tons, state bridge over Kiamichi river, Choctaw county, Oklahoma; bids Dec. 20.
625 tons, state bridge, Narrowsburg-Galicoon, Sullivan county, New York; bids Dec. 20.
550 tons, highway bridge, Caryville, Fla.
545 tons, highway bridge, Concord, N. H.
500 tons, shapes and bars, three barrack buildings, Fort Sill, Okla.; bids Jan. 5.
470 tons, piling, dam, Springfield, Ill.; Hecker-Moon Co., Cleveland, low on general contract.
400 tons, additions to state institution, Rome, N. Y.
375 tons, postoffice and courthouse, Tyler, Tex.; bids Jan. 6.
350 tons, hospital building, department of interior, Albuquerque, N. Mex.; Robert E. McKee, El Paso, Tex., low on general contract.
300 tons, building, Forest Service, Ogden, Utah; Murch Bros. Construction Co., St. Louis, low on general contract.
250 tons, highway bridge, Cedar City, Mo.
250 tons, building state reformatory, Elmira, N. Y.
250 tons, shapes and bars, postoffice, Littleton, N. H.; bids Jan. 4.
225 tons, shapes and bars, postoffice, Waltham, Mass.; bids Jan. 4.
225 tons, state bridge, Shelby county, Ohio; bids to state highway department, Columbus, O., Dec. 23. Job includes 105 tons of concrete bars.
200 tons, building, Great Meadows prison, New York.
200 tons, state school, Newark, N. Y.
185 tons, highway bridge, New Bethlehem, Pa.
175 tons, postoffice Fort Lauderdale, Fla.; bids Jan. 13.
169 tons, bridge, Genesee county, New York.
150 tons, addition army and navy general hospital, Hot Springs, Ark.; Henry B. Ryan Co., Chicago, low.
150 tons, municipal garage, Binghampton, N. Y.
135 tons, coal bunkers, Armour & Co., Chicago.
130 tons, shapes and bars, addition, Bancroft school, Washington; Maas Construction Co., Baltimore, general contractor.
120 tons, boiler house for the war department, Carlisle, Pa.; general contract awarded to a Midwest constructor.
120 tons, bridge, Delaware City, Del.; bids opened by the United States engineer, Wilmington, Del., Dec. 16.
100 tons, shapes and bars, postoffice, Bryn Mawr, Pa.; Dondos Co., Atlantic City, N. J., contractor.
100 tons, state bridge, Newton, Mass.

Concrete Bars

States Continue Planning New Projects, but Work May Be Deferred—Awards Slightly Above Recent Average—5000 Tons Pend for New York Hospital

REINFORCING BAR PRICES, PAGE 45

New York—Reinforcing bar inquiry is heavier for highway and bridge work in New York and New Jersey, bids closing Dec. 28 on approximately 325 tons in the latter state. More than 1000 tons are active for New York state work. State hospitals also call for more than 1000 tons.

Boston—West Construction Co., Boston, is low on the caisson core wall, Enfield-Ware, Mass., for the metropolitan district water supply commission, bidding $999,625. The project requires close to 1000 tons of reinforcing bars.

Philadelphia—Following the recent award of 250 tons for the Norfolk, Va., postoffice, sellers of reinforcing bars here report little buying. Several jobs, however, are pending. Billet steel in cut lengths continues 1.45c to 1.55c, Pittsburgh.

Buffalo—The largest reinforcing bar contract in many months will be placed when the contractor is chosen for an addition to the state hospital at Gowanda, N. Y., on bids Dec. 22. Considerably more than 5000 tons of bars will be needed.

Pittsburgh—About 300 tons of reinforcing bars are being bought by the General Contracting Co., Pittsburgh, for the Negley run sewer here. Mill shipments of reinforcing steel are slower. Billet steel shows some strength for small lots, but the market of 1.50c to 1.60c is nominal for large orders.

Cleveland—Award of 1500 tons of concrete bars for the Brook Park village, Cuyahoga county, Ohio, bridge, to Truscon Steel Co., Youngstown, O., features the market. In bridge bids to be taken by the state highway department Dec. 23 and Jan. 3 are noted several jobs requiring bars, including 225 tons for a Shelby county bridge, and 70 tons for an Ashtabula county bridge.

Chicago—While several fairly large tonnages of concrete bars are pending for road work, orders are deferred and this business will be of little benefit to mills until spring. Bars for several federal dam projects still are to be purchased. New inquiry is light.

Awards Compared

	Tons
Awards, week ended Dec. 17	**3,170**
Awards, week ended Dec. 10	**2,620**
Awards, week ended Dec. 3	**2,027**
Awards, this week, 1931	**3,100**
Av. weekly awards, 1931	**6,808**
Av. weekly awards, 1932	**4,001**
Av. weekly awards, Nov.	**2,236**
Awards to date, 1931	**352,020**
Awards to date, 1932	**204,075**

Contracts Placed

1500 tons, state bridge, including approaches, Brook Park village, Cuyahoga county, O., to Truscon Steel Co., Youngstown, O.; through Highway Construction Co., Cleveland.
250 tons, postoffice, Norfolk, Va., to the Southern General Fireproof Co., Atlanta, Ga.
221 tons, bridges, Ola-Hot Springs road, Perry county, Oklahoma, to Laclede Steel Co., St. Louis.
200 tons, state bridge, Wellsville, N. Y., to Concrete Steel Co., New York; Welsh Bros., general contractors.
185 tons, Best Food store, San Francisco, to Soule Steel Co., San Francisco.
182 tons, Grace cathedral, San Francisco, to Gunn, Carle & Co., San Francisco.
165 tons, state bridge, Bonner's Ferry, Idaho, to Pacific Coast Steel Corp., Seattle; Puget Construction Co., Seattle, general contractor.
132 tons, state highway work at Globe, Ariz., to Concrete Engineering Co., Los Angeles.
130 tons, nurses' quarters, veterans' hospital, Bronx (New York), to Fireproof Products Co., New York; Otto Held, New York, contractor.
105 tons, state highway work in Ventura county, California, to unnamed interest.
100 tons, state road work, Schuylkill county, Pennsylvania, to Kalman Steel Corp., Bethlehem, Pa.
100 tons, high school, Lodi, N. J., to Truscon Steel Co., Youngstown, O.
100 tons, factory addition, American Tobacco Co., Trenton, N. J., to Truscon Steel Co., Youngstown, O.

Contracts Pending

5000 tons, state hospital, Gowanda, N. Y.; bids Dec. 22.
1500 to 2000 tons, 11 buildings at Fort Miley, Calif., bids Dec. 20.
1200 tons, Illinois road work; bids Dec. 23.
1000 tons, reinforced concrete caisson core wall for earth dam, metropolitan district water supply commis-

sion, Enfield-Ware, Mass.; West Construction Co., low, $999,625.

600 tons, rail steel, state dam, Springfield, Ill.; Hecker-Moon Co., Cleveland, low for general contract.

323 tons, state bridge Marked Tree floodway, Poinsett county, Arkansas bids Dec. 15.

300 tons, highway structures, Buffalo-Millersport, Erie county, New York; Roadway Trucking Corp., Williamsville, N. Y., contractor.

250 tons, infantry battalion barracks, Plattsburg, N. Y.; Skolnick Building Corp., New York, low, $224,000.

168 tons, Panama; bids Dec. 21, schedule 2818.

162 tons, plate bridge over Kiamichi river, Choctaw county, Oklahoma; bids Dec. 20.

155 tons, double leaf bascule span and three flanking spans, Hackensack river, Rutherford-Secaucus, N. J., readvertised Dec. 28; Trenton, N. J.

135 tons, highway, route S-26, section 3, from route 25 to Commercial avenue, New Brunswick, N. J.; bids Dec. 28, Trenton, N. J.

105 tons, state bridge, Shelby county Ohio; bids to state highway department, Columbus, O., Dec. 23.

Wire Buying Holds Well; January Increase Seen

Wire Prices, Page 45

Pittsburgh — A leading wire mill in this district will close Dec. 23 until about Feb. 1. Wire and nail business is slow. Jobbers are the lightest buyers, but a few automotive accounts are specifying manufacturing and spring wire and steel spoke wire. The market is fairly firm.

Worcester, Mass.—With some decline in wire buying, volume has held surprisingly well in most departments, auguring well for next month when many of the slower buyers are expected to purchase after the inventory period.

New York—American Steel & Wire Co. has beeked most of 300 tons of steel wire nails for the navy, bids closing Nov. 15.

Cleveland—Orders continue light, and nothing of importance has developed for first quarter. Truscon Steel Co., Youngstown, O., has booked 500,000 wire rope clips for the United States engineer at Memphis, Tenn., at $16,695, delivered, bids Nov. 14.

Chicago—Wire shipments are declining, little business in wire products appearing from agricultural districts, while with the exception of the automotive industry and several smaller consumers, manufacturers' wire demand is slower than during the past 30 to 60 days. The market continues $2 for carload lots of wire nails and 2.25c for plain wire.

Pipe

Mild Buying Flurry in East—Federal Loan for 15,000-Ton Dam—Gas Line Projected

PIPE PRICES, PAGE 58

New York—Closing of three public utility contracts for steel pipe, totaling approximately 3500 tons, is expected shortly. Two of these contracts are for the Consolidated Gas Co. and the Brooklyn Union Gas Co. The Argentine oil fields have a fairly substantial tonnage pending here. Two or three foundation jobs, including 1500 tons of steel pipe for the Jamaica, L. I., repair plant of the New York board of transportation, also are pending. Prices on 1000 tons of cement lined cast pipe for delivery and stacking at borough yards, New York, figure back close to $32, foundry, three bidders to share in the orders. Prices delivered were $41.40, $40 and $41.60. Schenectady, N. Y. has bids on 700 tons of 24-inch class C pipe. There is a slight flurry in buying and a heavier inquiry for small lots. Several hundred tons are pending for New York state highways and New York city sewers.

Boston—This city closes Dec. 22 on 1200 tons of cast pipe and also this week on 750 tons of other material, including service pipe frames, boxes, covers and branches. This is less pipe than was bought at the same time last year. Chapman Valve Mfg. Co., Indian Orchard, Mass., has booked gate valves and seats for the navy at $4640. While cast pipe inquiry is slightly heavier, buying is light.

Pittsburgh—Demand for tubular products of all kinds is nearing the lowest point of the year, the only exception being a few minor orders for mechanical tubing which the automotive industry is releasing. Line pipe inquiries are lacking and the 4000-ton inquiry from the Pure Oil Co., Chicago, for a line from Toledo to Detroit has been withdrawn until at least April of next year. Pipe mill operations are no better than 10 per cent. One mill operated for a time last week building up stocks of large seamless. Several railroads have inquired for boiler tubes for first quarter.

Chicago—The market for cast pressure pipe has declined to only a few small carload orders and practically no inquiries involving more than 100 tons. While to a certain extent this is a seasonal development, there is little hope of improved activity in the near future. The only important pending project in this district is the Wilmette, Ill., waterworks on which action is expected to be taken within the next few weeks.

Cast Pipe Placed

997 tons, 6, 8 and 12-inch, yard stocks, New York; 487 tons to Donaldson Iron Works, Emaus, Pa.; 340 tons to United States Pipe & Foundry Co., Burlington, N. J.; 170 tons, Central Foundry Co., Birmingham, Ala.

276 tons, 12 to 24-inch class B, Vernon, Calif.; to National Cast Iron Pipe Co., Birmingham, Ala.

800 tons, Richmond, Va., to Glamorgan Pipe & Foundry Co., Lynchburg, Va.

150 tons, 6 to 12-inch class 150, San Bruno, Calif., to United States Pipe & Foundry Co., Birmingham, Ala.

135 tons, state hospital, Matteawan and Rochester, N. Y., to Donaldson Iron Works, Emaus, Pa.

Steel Pipe Placed

Unstated tonnage, 10,000 feet, 3-inch, galvanized wrought iron or steel, Panama, to Cornell & Underhill, New York, $3180, delivered.

Cast Pipe Pending

15,000 tons, cast or equivalent steel, El Capitan dam, San Diego, Calif.; Reconstruction Finance Corp. to purchase $2,350,000 worth of bonds.

1200 tons, 8 to 16-inch, Boston; bids Dec. 22. Taking bids also on 150 tons of frames and covers, and 125 tons of service pipe, Dec. 21; on 250 tons of boxes and 75 tons of cast iron flanged steel frames, Dec. 22; on 150 tons of branches, curves and fittings, Dec. 28.

800 tons, 12-inch and under, Corpus Christi, Tex.; bids Dec. 19 with alternates on steel or wrought iron, for natural gas distribution.

759 tons, 4 to 12-inch class 150, La Habra, Calif., bids Dec. 27.

730 tons, 24-inch, Schenectady, N. Y., including 30 tons of fittings; United States Pipe & Foundry Co., Burlington, N. J., low.

300 tons, Tybee waterworks, Savannah Beach, Ga.; Reconstruction Finance Corp. to loan $22,000. Project includes 100,000-gallon tank.

225 tons, 8 to 18-inch, sewers, Manhattan and Long Island City, New York.

210 tons, up to 30-inch, state highway work, New York, bids Dec. 20.

Steel Pipe Pending

450 tons, welded steel pipe, small sizes, navy, east and west yards; Albert Pipe Supply Co., Brooklyn, N. Y., low; bids Dec. 13.

Unstated tonnage, 300-mile, $12,000,000 project, gas line from northern Montana to Spokane, for Spokane Gas & Fuel Co.

Unstated tonnage, cold drawn seamless black tubing, eastern and western navy yards; National Tube Co., Pittsburgh, low, $4642.14; delivered; black welded pipe, mostly standard, Albert Pipe Supply Co., Brooklyn, N. Y., low, $1684.42, delivered; bids Dec. 6, schedule 9149.

Strip

Production Is at Minimum—First Quarter Needs Not Yet Well Defined at Current Price

STRIP PRICES, PAGE 45

Pittsburgh—Orders for strip steel are declining but specifications are better than last summer. Strip mills here are operating alternate weeks. A leading automobile account is inquiring for first quarter and rustless and specialty grades of strip are in fair demand in the Detroit district. Price firmness is noted for hot-rolled, uniformly quoted at 1.45c, Pittsburgh. Little demand exists for cold strip. One large account recently inquired for first quarter and was quoted uniformly by all producers at 1.45c, base.

New York — Movement of strip steel here is slow, reflecting seasonal conditions. Prices are unchanged at 1.45c and 2.00c, Pittsburgh, for hot and cold grades, respectively.

Philadelphia—Strip prices are untested at 1.45c, Pittsburgh, on hot-rolled, and 2.00c on cold-rolled.

Cleveland — Automotive business has shown some improvement in the past week, while other lines have continued dull. Several large automotive manufacturers, including Ford and a few partsmakers, have placed additional orders. Makers are being pressed for immediate shipment, and some specifications are already in hand for January delivery. As indicated by specifications, leading builders are not planning shutdowns for more than the usual Christmas and New Year holidays. Hot-rolled strip continues 1.45c to 1.50c, base, Pittsburgh, and cold-rolled 1.90c to 2.00c, Cleveland.

Chicago—Strip demand is fairly well maintained as a result of a steady volume of business for automotive purposes. Specifications from miscellaneous consumers are slightly smaller than during preceding weeks, but producers are maintaining operations around 10 to 15 per cent. The market is fairly steady at 1.55c, Chicago, for hot strip and 2.00c, Pittsburgh-Cleveland, for cold-rolled strip.

Steel Rate Now 14, With Year Low of 12 Nearing

Pittsburgh — Ingot production here this week will average 16 to 17 per cent, off fractionally from the rate of a week ago. Operations of a leading mill continue on a good level at approximately 20 per cent. By the end of this week and all of next week the ingot rate here will recede to a vanishing point in some mills, as shutdowns are contemplated. Steelworks of an important wire mill is closing Dec. 23 for approximately a month and rolling of rails in another mill which began Dec. 14 will have been completed by this week. Eight out of 53 steelworks blast furnaces are in blast here; four belong to Carnegie Steel Co., three to Jones & Laughlin.

Philadelphia — Operations are off a point to 11 to 12 per cent, with a further reduction expected the remaining two weeks of the year. One mill has already shut down the one furnace in operation until Jan. 1.

Operations, week ended Dec. 17	**14**
Operations, week ended Dec. 10	**15**
Operations, week ended Dec. 3..	**16**
Operations, one year ago.....	**24**
High for 1932, Feb. 6.....	**28.5**
Low for 1932, July 9	**12**

Buffalo — Steelworks operations held at 11 per cent during the week ended Dec. 17, but this week will be as high as 16 per cent several days. The tentative schedule for this week is six open hearths on, compared with four last week. No capacity is scheduled the four days beginning Christmas.

Youngstown, O.—Steel plant operations here last week sagged fractionally to below 15 per cent, and may slide to around 14 per cent this week. An increase in ingot output at the Republic Steel Corp. Warren plant is offset by losses elsewhere. Carnegie plants continue to account for nearly two-thirds of the district's raw steel output. Eighteen out of 83 open hearths are melting.

Chicago — Steelmaking operations are entering into a seasonal decline that is expected to result in the slowest rate of the year over the holiday period. Output during the past week was lower at around 10 per cent, equaling the previous low for the year with the exception of some holiday periods. Blast furnace operations are steady, eight of 36 stacks continuing in blast.

Cleveland—Steel ingot production here for the week ended Dec. 17 was at 29 per cent, up from 27½ per cent in the preceding week, with Otis Steel Co. having four open hearths in operation; and Corrigan, McKinney Steel Co. and American Steel & Wire Co. three each. The rate will continue at 29 per cent at the beginning of this week.

Birmingham, Ala.—The steel producing rate has dropped slightly under 15 per cent. Stocks of ingots are light and finished steel demand is reflected immediately.

Warehouse Trading Light; Sheet Prices Adjusted

Warehouse Prices, Page 58

New York—Warehouse sheet market is influenced by numerous offerings of seconds of unusually good quality at low prices, adversely affecting the market for prime grades. Jobbers are not contemplating revision of sheet prices as in some districts. Volume is light, slight gains the first half of the month, having failed to hold.

Philadelphia — Warehouse prices here are unchanged, with no early revisions contemplated.

Pittsburgh — Demand for steel products from warehouse so far this month indicates that the volume will be the lightest of the year

Detroit—Blue annealed sheets, formerly 3.35c out of warehouse in Detroit, are now quoted 2.90c for 48-inch and narrower, and 3.05c for widths over 48 inches. It is encouraging that warehouse business has declined little from November.

Cincinnati — Jobbers note a shrinkage in steel demands of about 10 per cent from the November rate.

Chicago—Sales are declining slowly, with no improvement anticipated the remainder of the month.

St. Louis—Blue annealed sheets 48 inches and under now are 3.00c, and over 48 inches wide 3.15c. No. 24 sheets are reduced to 3.70c and No. 24 galvanized to 4.00c.

Semifinished Steel Consumers Are Covering

Semifinished Prices, Page 52

Tin mills are taking the largest tonnages of sheet bars at present, with billets, slabs and wire in slow demand. Consumers are signing contracts with regular sources of supply, at reaffirmed prices of $26, base, Pittsburgh, Youngstown, O., and Cleveland, for sheet bars, billets and slabs; $31 for forging bars, and $37 for wire rods. A fair-size order for skelp was placed during the week in the Pittsburgh district.

RAW MATERIAL PRICES

Delivered pig iron prices subject to 10 per cent freight surcharge, maximum 13.44c gross ton, from Jan. 4

Asterisk denotes price change this week

Pig Iron

Per Gross Ton

FOUNDRY, NO. 2

Chicago, furnace	$15.50
Pittsburgh, dist. fur.	15.00
Pittsburgh, delivered	15.63 to 16.13
Valley furnace	14.50 to 15.00
Cleveland fur., local del.	15.00
Philadelphia, delivered	13.26 to 13.76
Virginia furnace	17.25
Granite City, Ill., fur.	16.50 to 17.50
Buffalo, fur., local del.	16.00
Buff., all-rail, Boston	18.91 to 19.91
Buff., all-rail, Brooklyn	18.90
Buff., all-rail, Newark	17.28
Ala., Bir. fur., local del.	11.00
Ala., Nor. del., Bir. base	10.00
Alabama, del. Chicago	16.01
Alabama, del. St. L.	14.42
Alabama, del. Cincinnati	13.82
Ala., Phila., dock del.	15.00 to 15.25
Ala., Balt., dock del.	15.00
Alabama, New York dock	15.50
Ala., Boston dock del.	15.75 to 16.75
Tenn., Bir. base, local del.	13.00
Tennessee, del. Cinn.	13.82
Montreal, delivered	23.00 to 23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo, fur., local del.	16.50
Buff., all-rail, Brooklyn	19.40
Buffalo, all-rail, Newark	17.78
Buff., all-rail, Boston	19.91 to 20.91
Virginia furnace	17.75
Eastern, del. Phila.	13.76 to 14.26

FOUNDRY, NO. 1X

Buffalo fur., local del.	17.50
Eastern, del. Phila.	14.26 to 14.76

MALLEABLE

Valley furnace	14.50 to 15.00
Cleveland fur., local del.	15.00
Pittsburgh dis. fur.	15.00
Pittsburgh, delivered	15.63 to 16.13
Chicago, furnace	15.50
Buffalo fur., local del.	16.50
Eastern Penna, delivered	14.63 to 18.91
Granite City, Ill., fur.	16.50 to 17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh, district fur.	14.00
Pittsburgh, delivered	14.63 to 15.13
Eastern Penn., del.	13.50
Buffalo fur., local del.	15.50 to 16.00
Montreal, delivered	23.50
Valley, furnace	14.00

BESSEMER

Valley furnace	14.50 to 15.00
Pittsburgh, furnace	15.00
Pittsburgh, delivered	15.63 to 16.13

LOW PHOS.

Valley fur., standard	25.00
Philadelphia, standard	23.76 to 26.79
Copper-bear., E. Pa. fur.	21.50 to 23.00

GRAY FORGE

Valley furnace	14.00
Pittsburgh district fur.	15.00
Pittsburgh, delivered	15.63 to 16.13

CHARCOAL

Lake Superior, del. Chicago	23.04

SILVERY

Jackson County, O., fur. in per cents: 6—$18; 7—$18.50; 8—$18.75; 9—$19; 10—$19.50; 11—$20; 12—$20.50; 13—$21.50; 14—$22.50; 15—$23; 16—$24; 17—$25.50.

Pittsburgh and Buffalo furnace: 7 to 10—$19; 15—$21 to $23.

BESSEMER FERROSILICON

Jackson County, O., fur., in per cents: 10—$20.50; 11—$21; 12—$21.50; 13—$22.50; 14—$23.50; 15—$24; 16—$25; 17—$26.50.

Coke

Prices Per Net Ton

BEEHIVE OVENS

Connellsville furnace	$1.75 to 2.00
Connellsville foundry	2.50 to 4.25
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.21 to 8.81
Chicago, ovens, outside del.	7.00
Chicago, del.	7.75
New England, del.	10.00
St. Louis, del.	7.75
Birmingham, ovens	4.00
Indianapolis, del.	7.75
Ashland, Ky., ovens, Connell., basis	4.50
Portsmouth, O., ovens Connell., basis	4.50
Buffalo, ovens	7.50 to 8.00
Detroit, ovens	8.00
Philadelphia, del.	8.50

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports

Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania New Jersey furnaces (Nominal)

Foundry and basic, 56-63%, contract	7.50
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per units, alongside docks Atlantic ports (Nominal)

Foreign manganiferous ore, 45-55% iron, 6-10% man.	8.50 to 9.00
North African low phos.	7.50 to 8.50
Swedish basic, 65%	7.50 to 8.00
Swedish low phos.	9.00
Spanish, North African basic, 50 to 60%	7.00 to 8.00
Newfoundland fdy., 55%	8.00
*Tungsten, spot, short ton unit, duty paid	$ 9.75 to 10.00
Chrome ore, 48% gross ton c.i.f.	$17.00 to 18.00

Manganese Ore

(Nominal)

Prices, not including duty, are cents per unit; cargo lots.

*Caucasian, 52-55%	nominal
*South African, 52%	20 to 21 cents
*South African, 49-51%	19 to 20 cents
*South African, 44-47%	18 to 19 cents
*Indian, 48-50%	20 cents
Brazilian, 46-48%	18 cents

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Maryland, Georgia, Alabama	$35.00
Missouri	30.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	25.00 to 30.00
Georgia, Alabama	30.00

SILICA BRICK

Pennsylvania	$35.00
Joliet and East Chicago	47.00
Birmingham, Ala.	50.00

MAGNESITE BRICK

Per Net Ton

Burned, 9 x 4½ x 2½	$61.50
Unburned, 9 x 4½ x 2½	52.00

CHROME BRICK

Per Net Ton

F.o.b. shipping point	$42.50

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	38.00
Domes, Chewelah, Wash., base	20.90

Semifinished Steel

Prices Per Gross Ton

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$26.00
Pittsburgh, bessemer	26.00
Youngstown	26.00
Cleveland	26.00
Philadelphia	31.75
Chicago	26.00
Forging, Chicago	31.00
Forging, Pittsburgh	31.00
Forging, Philadelphia	35.75

SHEET BARS

Pittsburgh	26.00
Youngstown	26.00
Cleveland	26.00
Chicago	28.00

SLABS

Pittsburgh	26.00
Youngstown	26.00
Cleveland	26.00

WIRE RODS

Pittsburgh, Cleveland	$37.00
Chicago	38.00

SKELP

All grades, Pittsburgh	1.50c to 1.60c

Ferroalloys

(In dollars, except Ferrochrome)

Ferromanganese, 78-82%, tidewater, duty paid	$68.00
Ferromanganese, del. Pittsburgh	73.24
Spiegeleisen, 19-20%, domestic fur. spot†	24.00
Ferrosilicon, 50 per cent, freight all., c. l.	77.50
Do, less carload	85.00
Do, 75 per cent	126.00 to 136.00
Silicomang., 2½% carb.	105.00
2% carbon	110.00
1% carbon	115.00
(The above for spot carlots. Contract price $5 a ton less).	
Ferrochrome, 60-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Do, for spot delivery	10.50
Ferrotungsten, stand., lb. cont.	1.00 to 1.10
Ferrovanadium, 30-40 per cent, per lb. contained, on analysis	3.05 to 3.30
Ferrotitanium, c.l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt., all., lb.	8.50
Do, under 1 ton	9.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis; 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic per ton carload, 23-26% f.o.b. Anniston, Ala.; 24%, $2.75 unitage	65.00
Ferromolybdenum, stand. 50-60 per cent. per lb.	0.95
Cal. Molybdate, lb. cont.	0.80
Molybdate, lb. cont.	0.80

†Carloads. Differentials apply to quant.

Fluorspar

85 and 5 per cent grade

Washed gravel, f.o.b. Ill., Ky., net ton car loads	$12.00
Washed gravel, import duty paid tide, gross ton	18.50

Pig Iron

January Expected to Bring Renewed Buying—Seasonal Lag in Shipments—Prices Steady

PIG IRON PRICES, PAGE 52

Pittsburgh—Several radiator manufacturers have been inquiring for small tonnages, specifying some low phosphorus iron. A steel foundry near here purchased some bessemer iron. Foundry iron demand, however, appears to have slumped. The basic market is dormant, and no malleable is being sold at present in this district. Several foundries indicate they will operate after the first of the year. For inventory reasons, shipments are touching the low point this month. A nominal price structure of $15, furnace, for all grades except basic represents the market.

Boston—Pig iron prices are easier and buying is light, although 500 tons of No. 1X and 2X is reported to have been placed by a Providence, R. I., consumer. Dutch iron is $13, dock, and probably that figure could be shaded, while Indian is available at $14.50, dock. Under $17, delivered, is possible on eastern Pennsylvania, while Buffalo iron from Beacon may be delivered at some points at $17.50. The local maker is holding to $16, furnace, with light volume. Southern iron is easy at $15.75, dock.

New York—With the General Fire Extinguisher Co.'s requirements of 700 tons of malleable and 500 tons of foundry reported placed, the local pig iron market is devoid of sizable inquiry. Buffalo foundry iron is holding nominally at $14, furnace; and eastern Pennsylvania iron, $12.50 to $13, furnace.

Philadelphia—Sales are confined to carlots for spot shipment. Eastern Pennsylvania iron is $12.50 to $13, furnace. A cargo of Royal Dutch iron is expected here before Jan. 1.

Buffalo—American Radiator & Standard Sanitary Corp. will not resume operations here until in January, about 30 days later than it anticipated. Pig iron demand has dropped to the usual pre-holiday proportions.

Cleveland—Sales and shipments are tapering, not much more than 1000 tons being booked by furnace interests here in the past week. It is apparent now that the movement to foundries this month will not measure up to that in November. The carryover to first quarter on furnace books will not be large, because bookings have held close to actual early requirements; it is understood that some of the large automotive foundries have enough iron on hand to last them well into 1933. Buyers generally are disposed to wait until after the holidays. The market here is steady at $15, base, furnace, for local delivery.

Chicago—The decline in pig iron shipments this month has been small compared with that experienced at this period during the two preceding years. The total is expected to hold above the low August rate, with definite indications of an upturn in January. Some new business is being received, principally for small lots. Foundry operations generally are lower than in November. Prices are firm, continuing $15.50, furnace, for No. 2 foundry and malleable.

St. Louis — Practically all stove plants in this district have closed, until some time in January. Specifications from radiator and furnace companies show more than the usual seasonal reduction. Pig iron producers anticipate marked improvement in sales in January.

Cincinnati—An inquiry for 1000 tons of pig iron for an Ohio melter was received here during the week.

Toronto, Ont.—The daily melt in this district is holding to around 18 per cent; only single carlots of iron are being sold, and those for prompt shipment.

Birmingham, Ala.—Production and shipments are at low ebb, with only two blast furnaces now in operation

Ferromanganese Prices Extended by Some Sellers

Ferroalloy Prices, Page 52

Following the action of a domestic seller of ferromanganese in reaffirming the $68 price on carlots for the first half of 1933, the principal English producer has made a similar announcement. Other sellers are expected to open their books shortly. Domestic spiegeleisen 19 to 21 per cent, is unchanged at $24, furnace, in carlots for spot shipment. On contracts, prices are subject to individual negotiation.

Foreign Manganese Ore Prices Reduced

Iron Ore Prices, Page 52

New York—South African manganese ore has been reduced nominally 2 cents per unit to 20.00c to 21.00c, not including duty, for 52 per cent grade, to 19.00c to 20.00c for the 49-51 per cent; and to 18.00c to 19.00c for the 44 to 47 per cent. Indian manganese, 48 to 50 per cent, is down 2 cents to 20.00c. Buying continues negligible on all foreign ores.

Coke

Consumption of Furnace and Foundry Grades in Year-end Decline—Domestic Fuel Active

COKE PRICES, PAGE 52

Pittsburgh—Several foundries anticipating a better melt in January indicate they will inquire for coke the latter part of this month. Only minor quantities of beehive foundry and furnace coke are being sold, with prices unchanged. Standard foundry grades bring $2.50 to $3; and premium brands, $4 to $4.25. Furnace coke is moving at $1.50 to $2.

Cincinnati — Specifications for foundry coke have dropped from the recent levels, but domestic grades are more active.

New York—Metallurgical coke specifications are the lightest of the year, reflecting pre-inventory conditions. Prices are steady.

Chicago—The movement of foundry coke so far this month is ahead of the November rate, due partly to the fact that foundries are taking in supplies to cover consumption over winter months. Zero weather has stimulated shipments of heating coke, and this business is heavier than in November and ahead of the volume a year ago. By-product foundry coke continues $7, ovens, for outside delivery, and $7.75, delivered Chicago.

St. Louis—Except for a brisk movement of heating coke, the market is active.

Birmingham, Ala.—Though coke consumption here has slowed down, no change is noted in the movement to other districts. By-product foundry coke is firm at $4, base, ovens.

Scrap

Decline in Prices Brings Low Level—Year-End Apathy Limits Buying to Bare Necessities

Chicago—The scrap market is adversely affected by declining operations among leading consumers and absence of new business. Shipments against contracts are light and dealers are inactive. Recent sales of small lots of heavy melting steel to one independent mill at $5.50 established this price as top of the market, only 50 cents a ton above the summer low. Quotations on several grades are easier although lack of demand leaves most quotations nominal.

Boston—Activity in scrap is limited largely to barge shipments of No. 1 cast and stove plate, about 2200 tons being sold for eastern Pennsylvania delivery by water, with some additional lots about to close. Little scrap is moving outside New

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	7.50 to	8.00
Boston, dealers	3.25 to	3.75
Buffalo, No. 1	7.00 to	7.50
Buffalo, No. 2	6.00 to	6.50
Chicago	5.00 to	5.50
Cleve., No. 1	7.00 to	7.50
Cleve., No. 2	6.00 to	6.50
Det., No. 1 deal.	4.50 to	5.00
Det., No. 2 deal.	3.00 to	3.50
E. Pa. del. mill		6.50
E. Pa., No. 2 del.	5.00 to	5.50
N. Y. deal. R. R.	4.00 to	4.50
N. Y. deal. No. 2		3.00
N. Y. deal. yd.	2.50 to	3.00
Pitts. No. 1	8.25 to	8.75
St. L. No. 1 sel.	5.50 to	6.00
Federal, Ill.	4.75 to	5.25
Granite City, Ill.	5.00 to	5.50
Valleys, No. 1	8.50 to	9.00

COMPRESSED SHEETS

Buffalo, dealers	6.00 to	6.50
Chi. (Factory)	3.75 to	4.25
Cleveland	6.50 to	7.00
Detroit, dealers	4.00 to	4.50
E. Pa. new mat.	5.00 to	5.50
Pittsburgh	8.00 to	8.50
Valleys	8.25 to	8.75

BUNDLED SHEETS

Buffalo	4.00 to	4.50
Cinci., del.	4.25 to	4.75
Cleveland	4.50 to	5.00
Eastern, Pa.		5.00
Pittsburgh	7.00 to	7.50
St. Louis	1.50 to	2.00

SHEET CLIPPINGS LOOSE

Chicago	2.00 to	2.50
Cincinnati	2.00 to	2.50
Detroit, dealers	1.25 to	1.75
St. Louis	1.50 to	2.00

STEEL RAILS SHORT

Birmingham	8.50 to	9.00
Boston, dealers	2.75 to	3.00
Buffalo	9.50 to	10.00
Chicago (3 ft.)	7.50 to	8.00
Chicago (2 ft.)	8.00 to	8.50
Cinci., del.	9.00 to	9.50
Detroit, deal.	8.00 to	8.50
Pitts. (open-hearth, 3 ft. and less)	10.50 to	11.00
St. Louis	7.00 to	7.50

STOVE PLATE

Birmingham	5.00 to	5.50
Boston, dealers	2.50 to	3.00
Buffalo	7.50 to	8.00
Chicago, net	5.50 to	6.00
Cinci., deal. net	3.50 to	4.00
Det., net deal.	2.50 to	3.00
Eastern Pa.	6.00 to	6.50
N. Y., deal. mill	2.50 to	3.00
St. Louis	5.50 to	6.00

COUPLERS, SPRINGS

Buffalo	9.00 to	9.50
Chicago	6.50 to	7.00
Eastern Pa.		8.50
Pittsburgh	8.75 to	9.25
St. Louis	5.25 to	6.25

ANGLE BARS—STEEL

Chicago	7.00 to	7.50
St. Louis	5.75 to	6.25

LOW PHOSPHORUS

Buffalo, billets and bloom crops	9.00 to	9.50
Cleveland bil. and bloom crops	10.00 to	11.00
Eastern Pa.		8.50
Pittsburgh billet bloom crops	10.50 to	11.00
Pitts., sheet bar crops	10.50 to	11.00

FROGS, SWITCHES

Chicago	5.50 to	6.00
St. Louis	5.00 to	5.50

SHOVELING STEEL

Chicago	5.00 to	5.50
Cleveland	5.75 to	6.00
St. Louis	4.75 to	5.25

RAILROAD WROUGHT

Birmingham	7.50 to	8.00
Boston, dealers	1.00 to	1.50
Buffalo, No. 1	4.50 to	5.00
Buffalo, No. 2	7.00 to	7.50
Cinci., No. 2	5.00 to	5.50
Chi., No. 1, net	4.50 to	5.00
Chicago, No. 2	5.50 to	6.00
Eastern Pa.		6.50
N. Y., No. 1, deal.	2.50 to	3.00
Pitts., No. 2	8.25 to	8.75
St. Louis, No. 1	3.50 to	4.00
St. Louis	4.75 to	5.25

SPECIFICATION PIPE

Boston	3.00 to	4.00
Eastern Pa.	7.00 to	7.50
N. Y., deal	2.00 to	2.25

BUSHELING

Buffalo, No. 1	6.00 to	6.50
Chicago, No. 1	3.75 to	4.25
Cinn., No. 1 dl.	4.00 to	4.50
Cinn., No. 2	2.50 to	3.00
Cleve., No. 2	3.00 to	3.50
Det., No. 1 new deal.	3.25 to	3.75
St. L., No. 1	3.00 to	3.50
Val. new No. 1		8.75

MACHINE TURNINGS

Birmingham	2.50 to	3.00
Boston, dealers	0.75 to	1.00
Buffalo	3.75 to	4.25
Chicago	3.00 to	3.50
Cin., deal.	3.00 to	3.50
Cleveland	4.50 to	5.00
Detroit	1.25 to	1.75
Eastern Pa.	3.00 to	3.50
N. Y., deal	1.35 to	1.50
Pittsburgh	6.00 to	6.50
St. Louis	1.50 to	2.00
Valleys	6.50 to	7.00

BORINGS AND TURNINGS
For Blast Furnace Use

Boston, dealers	.75 to	.90
Buffalo	3.75 to	4.00
Cinn., deal.	3.00 to	3.50
Cleveland	4.50 to	5.00
Detroit, deal	1.75 to	2.25
Eastern Pa.	3.50 to	3.75
N. Y., deal.	1.35 to	1.50
Pittsburgh	5.50 to	6.00

CAST IRON BORINGS

Birming., chem.	12.00 to	13.00
Birming., plain	2.50 to	3.00
Boston, chem.	5.50 to	6.00
Boston, dealers	1.00 to	1.25
Buffalo	4.25 to	4.50
Chicago	3.25 to	3.75
Cinn., deal.	3.00 to	3.50
Cleveland	4.50 to	5.00
Detroit, deal.	1.75 to	2.25
Eastern Pa.	3.50 to	3.75
E. Pa., chem.	8.00 to	10.50
N. Y., deal.	1.00 to	1.50
Pittsburgh	5.50 to	6.00
St. Louis	2.00 to	2.50

PIPE AND FLUES

Cinn., deal.	3.25 to	3.50

RAILROAD GRATE BARS

Buffalo	4.00 to	4.50
Chicago, net	5.00 to	5.50
Cincinnati	4.00 to	4.50
Eastern Pa.	5.50 to	6.00
N. Y., deal.	3.50 to	4.00
St. Louis	4.50 to	5.00

FORGE FLASHINGS

Boston, dealers	2.00 to	2.50
Buffalo	5.50 to	6.00
Cleve. ov. 10 in.	6.00 to	6.50
Detroit	2.75 to	3.25

FORGE SCRAP

Boston, dealers	1.75 to	2.00
Chicago	6.50 to	7.00
Eastern Pa., del.	5.00 to	5.50

ARCH BARS, TRANSOMS

Chicago, net	5.00 to	5.50
St. Louis	3.50 to	4.00

AXLE TURNINGS

Boston, deal.	2.50 to	3.00
Buffalo	6.25 to	6.75
Chi., elec. fce.	4.50 to	5.00
Cleveland	5.50 to	6.00
Eastern Pa., del.		7.00
Pittsburgh, O. H.	7.00 to	7.50
St. Louis	3.00 to	3.50

STEEL CAR AXLES

Birmingham	9.00 to	9.50
Boston, ship. pt.	6.00 to	6.50
Buffalo	10.00 to	10.50
Chicago, net	8.50 to	9.00
Eastern Pa.		14.50
St. Louis	8.75 to	9.25

SHAFTING

Boston, ship. pt.	7.00 to	7.50
N. Y., deal.	6.50 to	7.00
St. Louis	7.50 to	8.00
E. Penna.	11.00 to	12.00

CAR WHEELS

Birming., iron	7.00 to	7.50
Boston, iron deal.	3.50 to	4.00
Buffalo, iron	7.00 to	8.00
Buffalo, steel	8.50 to	9.00
Chicago, iron	7.00 to	7.50
Chi., rolled steel	7.00 to	7.50
Cincinnati iron	6.25 to	6.75
E. Pa. steel	8.50 to	9.00
E. Pa. iron		8.50
Pitts., iron	7.75 to	8.25
Pitts., steel	8.75 to	9.25
St. Louis, iron	4.75 to	5.25
St. Louis, steel	6.00 to	6.50

NO. 1 CAST SCRAP

Birmingham	8.00 to	8.50
Buffalo (Mach.)	9.75 to	10.25
Buffalo, cupola	9.00 to	9.50
Boston, textile	6.75 to	7.00
Boston No. 2	2.50 to	3.00
Chi., mach. net	6.00 to	6.50
Chi., railroad, net	5.25 to	5.75
Chicago, agri., net	5.25 to	5.75
Cinn., mach. cup.	7.00 to	7.50
Cleve. cupola	7.00 to	8.00
Det., net deal.	6.50 to	7.00
E. Pa. cupola	9.00 to	9.50
N. Y., cup. deal.	5.00 to	5.50
N. Y., del. local foundries	8.00 to	8.50
Pitts., cupola	8.50 to	9.00
San Fran., del.	13.50 to	14.00
Seattle	4.50 to	6.50
St. L. No. 1 ma.	6.00 to	6.50
St. L. No. 1	5.50 to	6.00

HEAVY CAST

Boston, del.	3.25 to	3.50
Bost., mach. cast	7.00 to	7.50
Buffalo, break	6.50 to	7.00
Cleve., break	5.50 to	6.00
Detroit, auto, net deal.	7.00 to	7.50
Det., break., dl.	4.00 to	4.50
Eastern Pa.		8.50
N. Y. No. 1, dl.	5.00 to	5.50
N. Y. break, dl.	4.50 to	5.00
Pittsburgh	8.00 to	8.50

MALLEABLE

Boston, consum.	7.50 to	8.00
Buffalo	8.00 to	8.50
Chicago, agri.	5.00 to	5.50
Chicago, R. R.	6.00 to	6.50
Cinci., R. R., del.	6.50 to	7.00
Cinci., agri. del.	6.00 to	6.50
Cleveland, rail	7.50 to	8.00
Det. auto deal.	5.00 to	5.50
St. Louis	7.00 to	7.50

RAILS FOR ROLLING
5 *feet and over*

Birmingham	8.00 to	9.00
Boston, deal.	5.00 to	5.50
Buffalo	7.00 to	7.50
Chicago	8.00 to	8.50
Eastern Pa.		9.50
New York dealer	4.25 to	4.75
St. Louis	7.00 to	7.50

LOCOMOTIVE TIRES

Chicago, cut	7.00 to	7.50
St. L., No. 1	5.00 to	5.50

LOW PHOS. PUNCHINGS

Chicago	7.50 to	8.00
Buffalo	9.00 to	9.50
Eastern Pa.		8.50
Pittsburgh	10.50 to	11.00

England by rail. Local consumption is in small lots, Worcester paying $5 for No. 1 steel and $4 for No. 2.

New York—Cast grades of scrap are lower while prices on others are nominal and untested. Cast is off 25 to 50 cents for the three leading grades. Buying is light, one New Jersey pipe foundry refusing to pay over $7.50, delivered, for No. 1.

Philadelphia — Following reductions the past three weeks, scrap prices have steadied. However, there have been no important transactions to test the market.

Buffalo—There is a good undercurrent of inquiry for heavy melting steel for delivery after Jan. 1, but no actual contracts have been closed.

Pittsburgh — Weakness in scrap prices has been substantiated by several sales into consumption at 25 cents under a week ago. The Steubenville, O., mill has issued orders for about 4000 tons of No. 1 heavy melting steel at $8.50, including 2000 to 3000 tons in the November Pennsylvania railroad list. Johnstown, Pa., also has been receiving shipments of heavy melting steel at around $8.50.

A mill in this district has bought 2000 tons of turnings at $6.25.

Cleveland—Sales and shipments of scrap are at a minimum, with prospects of better tonnage after New Year. Prices are largely nominal in the absence of trading.

Detroit—Forge flashings and machine shop turnings each have yielded 25 cents more in a stagnant scrap market. Demand from consumers continues negligible. Offerings of scrap are a little broader but not so much as the increase in automobile production would indicate.

Cincinnati—Lower quotations on some grades of iron and steel scrap are in effect as a result of suspension in buying by mills. Shipments against orders are continued, but usually restricted. Heavy melting steel and rails are off 50 cents, with malleable also lower.

St. Louis—The sale of a round tonnage of scrap to American Steel Foundries, including a variety of grades, was the first transaction in some time on which actual values could be based, and the result has been a drastic and general reduction in quotations.

Birmingham, Ala.—Quotations remain low and demand is light. Despite contradiction as to prices, dealers claim that there is little demand. No. 1 cast is active and scarce.

Toronto, Ont.—General stagnation prevails in the iron and steel scrap markets, according to local dealers. Melters are out of the market except for current consumption.

Equipment

Japanese Place Orders for $200,000 Worth of Tools

New York—Heavy buying of machinery by Mitsui & Co. for Japan recently, most of the business going to the Cincinnati district, has filled several plants with capacity business. Nearly 100 tools were bought, including more than 50 milling machines. Included in the business also were lathes, radial drills and other tools, the total volume mounting to more than $200,000, the largest order placed since the last contracts made by the Amtorg Trading Corp. for Russia.

Exclusive of this business which is now confirmed, the outlook is slightly better. A truck builder is in the market for some equipment and a few other small inquiries are out. In addition, a good volume of government business has been placed while substantial navy yard shop lists are up for closing Dec. 20 and Jan. 4.

Washington—Machinery awards for navy yards on which bids were taken recently include: Boring mill, Brooklyn, Wilson-Brown Co., New York; two radial drills, Brooklyn, Carlton Machine Tool Co., Cincinnati; four radial drills, Cincinnati-Bickford Tool Co., Cincinnati; four radial drills, Norfolk, Smith-Courtney Co., Richmond, Va.; shear, Brooklyn, Niagara Machine & Tool Works, Buffalo; gear-hobbing machine, Norfolk, Tidewater Supply Co., Norfolk, Va.

Low on recent bids were: Shaper, Sewalls Point, Va., Rockford Machine Tool Co. and Smith-Courtney Co., both $2500; surface grinder, Norfolk, Thompson Grinder Co., Springfield, O.; precision lathe, Mountain View, Calif., South Bend Lathe Works; engine lathe, Mountain View, Sidney Machine Tool Co., Sidney, O.

Worcester, Mass.—In general there has been no improvement in machinery buying, but in spots some improvement is noted. Morgan Construction Co. is active in the engineering and designing of a merchant steel mill in Australia, equipment to be bought and mill built in England. Government shipyard inquiry is more active and some awards have been made, including gear-hobbing machine, Boston, Henry Prentiss & Co., $8134; plain milling machine, Mare Island, Brown & Sharpe Mfg. Co., Providence; balancing machine, Portsmouth, N. H., Triplex Machine Tool Co., New York, low; precision lathe, Mountain View, Calif., Pratt & Whitney Co., Hartford; two engine lathes, Boston, Sidney Machine Tool Co., low.

Pittsburgh—Included in additional rehabilitation pledges totaling nearly $550,000 which were reported last week by the Pittsburgh district subcommittee of the national committee on industrial rehabilitation, was a pledge by Allegheny Steel Co. of $100,000. Much of this sum, however, will be spent for ordinary maintenance expenditures. Fewer inquiries are out for steel mill equipment although one mill here is reported to be actively considering new blooming mills at one of its plants.

Machine tool interests have sold four or five individual pieces of machinery during the past two weeks but most of this represents work which had been figured and pending for considerable time. A few inquiries for single pieces of machinery appear encouraging at this time. Standard Stoker Co. is expected to be in the market for machine tools to the extent of about $20,000 total.

Cleveland—Local activity in machinery and equipment continues at a low rate, with occasional orders coming in for single machines, mostly for replacement. The outlook for the next few weeks is unsettled, but the gloomy tone of Col. Ayres' recent forecast is being discounted in many quarters. Inquiries continue from manufacturers of soda fountain and brewing equipment, but it is felt that they are somewhat premature and not likely to result in any immediate business. It is reported that a local manufacturer is operating considerably in excess of normal capacity on small-size twist drills for shipment to Japan.

Chicago—Usual December quietness is encountered in the market for machine tools and plant equipment, and sales have declined from the recent volume. Inquiry also lacks improvement with prospective buyers deferring closing on recent inquiry. Several machine tools for Chicago Great Western railroad still are pending, while another road is in the market for two track welders. Grunow Corp., which is commencing preliminary operations in the production of electric refrigerators, is closing on several tools remaining on its recent list. Production is expected to become fully under way early in 1933. Sales of small tools lack improvement and little change is anticipated over remaining weeks of this month.

Nonferrous Mill Products

Base price cents per pound f.o.b. mill except otherwise specified. Copper and brass product prices based on 6.25c, Conn., for copper

SHEETS	
Yellow brass (high)	12.50
Copper, hot rolled	15.37½
Lead sheets, cut, to jobbers	7.00
Zinc sheets (100-lb. base)	9.00
TUBES AND PIPES	
Seamless yellow brass (high)	15.25
Seamless copper	14.37½
RODS	
Yellow brass (high, full turning)	10.25
Naval brass	11.37½
ANODES	
Copper, untrimmed	12.25
WIRE	
Yellow brass (high)	12.50

Old Metals

Dealers' buying prices, cents lb.

No. 1 Composition· Red Brass	
New York	2.62½ to 2.75
Chicago	2.12½ to 2.25
Cleveland	2.25 to 2.50
St. Louis	2.50
HEAVY YELLOW BRASS	
New York	1.87½ to 2.00
HEAVY COPPER AND WIRE	
New York	3.50 to 3.75
Chicago, No. 1	3.00 to 3.12½
Cleveland	2.50 to 2.75
St. Louis	2.75
COMPOSITION BRASS BORINGS	
New York	2.37½ to 2.50
YELLOW BRASS TUBING	
Cleveland	1.50 to 1.75
LIGHT COPPER	
New York	2.62½ to 2.75
Chicago	2.12½ to 2.25
Cleveland	2.00 to 2.25
St. Louis	2.50
LIGHT BRASS	
Chicago	1.12½ to 1.25
Cleveland	1.00 to 1.25
St. Louis	1.50
LEAD	
New York	2.00 to 2.25
Cleveland	1.50 to 2.00
St. Louis	2.00
ZINC	
New York	1.12½ to 1.25
Cleveland	1.00 to 1.12½
St. Louis	1.25
ALUMINUM	
Clippings, new, soft, Cleve.	9.50 to 10.00
Clippings, hard, Cleveland	6.50 to 7.00
Borings, Cleveland	3.00 to 3.50
Mixed cast, Cleveland	4.00 to 5.00
Mixed cast, St. Louis	3.75 to 4.00

Secondary Metals

Remelt aluminum No. 12	8.00 to 9.00
Brass ingot, 85-5-5-5	5.50

Metals

Quotations Show Little Change Although Unfavorable Factors Develop—Copper Holds at 5.00c

New York—Metal prices held largely unchanged last week despite continued slow demand, unfavorable developments in the international war debt situation and uncertainty in the copper market arising from declining prices abroad and reports of plans for increased production.

Copper—Electrolytic copper continued at 5.00c, Connecticut basis, for delivery through the first quarter of 1933 as quoted by custom smelters. Mine producers remained out of the market at the nominal quotation of 6.25c. The market domestically maintained a steady tone despite the breakup of the world conference on curtailment. This was due to the fact that purely domestic producers probably will not increase production and may in some instances shut down entirely. The bulk of the huge world accumulations of copper is held in this country and producers feel that there can be little improvement in the price position until this is largely dissipated. The possibility still exists that foreign producers may yet agree on curtailment since prices abroad have fallen since the conference breakup. Demand for copper continued extremely slow in this country last week. This also was true for copper and brass products and brass ingot. Scrap was slightly easier.

Tin—Buying was dull with quotations largely nominal. Quotations moved in sympathy with fluctuations in sterling exchange and quotations on the London metal exchange. Rapid fluctuations in exchange caused considerable confusion in quotations here.

Zinc—Business was confined last week to scattered carlots booked from day-to-day, mostly for prompt delivery. Producers maintained a firm position with regard to prices in view of the steady ore market. No resale metal was reported offered to disturb the market.

Antimony—The market was dull with prices untested.

Lead—Tone of the market continued steady, although business was in relatively light volume. Buying was mostly for delivery this month. Corroders were the chief buyers.

Aluminum—Prices were steady. The automotive industry is the best current buyer of remelt grades.

Contracting for By-Products

New York—Distillates continue firm, with production moving directly into consumption. Lacquer makers are taking toluol in slightly better volume. Some contracting for benzol is being done at recently reaffirmed prices, and naphthalene contracting is more active. Sulphate of ammonia is moving at the recently announced advanced prices.

Coke By-Products

Per Gallon, Producers' Plants, Tank Lots

	Spot
Pure benzol	$0.20
90 per cent benzol	0.20
Toluol	0.30
Solvent naphtha	0.26
Commercial xylol	0.26
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.153 to 0.173
Per Pound at Producers' Plants	
Naphthalene flakes	4.75 to 5.75
Naphthalene balls	4.75 to 5.75
Per 100 Pounds Atlantic Seaboard	
Sulphate of ammonia	$1.10

Quicksilver Steady

New York—Quicksilver prices are unchanged, and the market is quiet. Small lots on prompt delivery are $49, a virgin flask of 76 pounds, and round lots are held at $48 a flask. Recent price easiness has been reported on the Pacific coast, but this tendency has as yet unaffected the market here.

Nonferrous Metal Prices of the Week, Cents a Pound

Spot unless otherwise specified

	Copper			Straits Tin New York		Lead	Lead East	Zinc	Aluminum	Antimony	Ingot
	Electro., del. Conn.	Lake, del. Midwest	Casting refinery	Spot	Futures	N. Y.	St. L.	St. L.	98-99%	Spot. N. Y.	Nickel
Dec. 10	5.00	5.37½	4.75	22.70	22.85	3.00	2.87½	3.12½	22.90	5.40	35.00
Dec. 12	5.00	5.25	4.75	22.65	22.80	3.00	2.87½	3.12½	22.90	5.40	35.00
Dec. 13	5.00	5.25	4.75	22.55	22.70	3.00	2.87½	3.12½	22.90	5.40	35.00
Dec. 14	5.00	5.25	4.75	22.55	22.75	3.00	2.87½	3.12½	22.90	5.40	35.00
Dec. 15	5.00	5.12½	4.75	22.80	23.00	3.00	2.87½	3.12½	22.90	5.40	35.00
Dec. 16	5.00	5.12½	4.75	22.80	23.00	3.00	2.87½	3.12½	22.90	5.40	35.00

Pacific Coast

Demand Tapering as Year End Approaches — Private Projects Fail To Appear—Prices Have Little Test and Are Nominal —Northwest Finds Selling Is In Small Lots Only

San Francisco—(*By Air Mail*)—With the approach of inventory time demand is easing. The reinforcing bar market was the most active of the week. Close to 2000 tons of reinforcing steel will be needed in 11 buildings at Fort Miley, Calif., bids on which open Dec. 20. Prices are stationary.

Awards of reinforcing steel aggregated 900 tons. Soule Steel Co. booked 185 tons for the Best Food store in San Francisco. Gunn, Carle & Co. secured 182 tons for Grace cathedral, San Francisco, and the Concrete Engineering Co. was awarded 132 tons for highway work in Arizona. Bids have been opened on 250 tons for the San Jacinto tunnel, Los Angeles. Merchant bar steel holds at 2.10c, c.i.f. with demand limited to small lots.

Bids open on Dec. 21 for 200 tons of plates for four boilers for Mare Island, Calif. Quotations hold at 2.00c, c.i.f.

Herrick Iron Works took 190 tons of shapes for buildings at Government Island, Calif. The tonnage involved in the San Francisco post-office addition, bids on which open Dec. 28, will be 1000 tons instead of 700 tons as previously reported. Bids have been opened on 250 tons for tunnel lining for the San Jacinto tunnel, Los Angeles. Funds for the work have been applied for from the Reconstruction Finance Corp. Wide flange material holds at 2.20c, c.i.f., while standard shapes are 2.10c.

National Cast Iron Pipe Co. took 276 tons for Vernon, Calif., and the United States Pipe & Foundry Co. secured 150 tons for San Bruno, Calif. San Francisco has opened bids on 610 tons of 6-inch pipe and La Habra, Calif., will open bids Dec. 27 for 759 tons of 4 to 12-inch cast iron pipe.

Sales Light at Seattle

Seattle—The steel trade is feeling the lack of buying on the part of the lumber industry. Of 322 mills in Oregon and Washington, only 97 are operating. Production is only 18.9 per cent of total capacity but inventories are 28.3 per cent less than a year ago.

Awards this week included 700 tons of structurals to the Columbia Steel Co., Seattle office, and 165 tons of reinforcing bars to the Pacific Coast Steel Corp., Seattle, for the Bonner's Ferry, Idaho, state bridge. Puget Construction Co., Seattle, has the general contract.

Trade interest centers in awards for the Seattle water system extension, bids Dec. 14, and the irrigation service penstocks and discharge pipe, bids opened Dec. 8. The Seattle project involves 1800 tons of plate, if steel pipe is adopted, or 5800 tons of cast iron, if that type is purchased. The Wapato job calls for 450 tons of plates. Beall Pipe & Tank Co., Portland, is low for the penstocks, Valley Iron Works, Yakima, Wash., low for steel pipe. Subcontract for 125 tons of sheet piling and liner plate for a tunnel at Puget Sound Navy yard is pending. Thirteen firms are figuring on a Vancouver, B. C., pipe job, bids Jan. 4, calling for about 450 tons of plates.

Steel in Europe

British Position Is Better—Output Increasing

London — (*By Cable*) — Inquiries for steel and iron products are expanding, including some forward business, and prices are stiffening. The Middlesbrough district is especially active, principally in pig iron.

While pig iron production in November was 267,700 tons, a loss of 7900 tons from the 275,600 tons of October, the daily rate gained from 8884 tons to 8923 tons, due to the shorter month. Steel production rose 34,000 tons from 439,800 tons in October to 473,800 tons in November. Imports fell off sharply, with 57,892 tons in November, 163,200 in October. Exports gained 9861 tons, from 160,400 in October to 170,261 tons in November.

Business on the Continent is reported as quieter. French works are competing in exports, German works withdrawing. Prices are lower.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Dec. 15

Export Prices f.o.b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665	
		£ s d		£ s d
PIG IRON				
Foundry, 2.50-3.00 Silicon	$ 9.62	2 18 6	$8.27	1 14 0
Basic bessemer	8.88	2 14 0*	6.81	1 8 0
Hematite, Phos. .03-.05	9.71	2 19 0	.....	.....
SEMIFINISHED STEEL				
Billets	$16.04	4 17 6	$10.22	2 2 0
Wire rods, No. 5 gage	24.68	7 10 0	21.90	4 10 0
FINISHED STEEL				
Standard rails	$25.50	7 15 0	$26.77	5 10 0
Merchant bars	.92c	6 5 0	.62c	2 16 0
Structural shapes	1.08c	7 7 6	.48c	2 4 0
Plates, †¾ in. or 5 mm	1.29c	8 15 0	.72c to .73c	3 5 0 to 3 6 0
Sheets, black, 24 gage or 0.5 mm.	1.21c	8 5 0	1.29c	5 17 6
Sheets, gal., 24 gage, corr.	1.77c	10 0 0	1.46c	6 12 6
Bands and strips	1.14c	7 15 0	.77c to .80c	3 10 0 to 3 12 6
Plain wire, base	1.40c	9 10 0	1.18c	5 7 6
Galvanized wire, base	1.69c	11 10 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base	1.62c	11 0 0	1.21c	5 10 0
Tin plate, box 108 lbs.	$ 2.63	0 16 0	$3.20	0 13 2

British ferromanganese $68 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

		£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$ 9.62	2 18 6	$ 8.02	205(2)	$ 8.31	300	$14.99	63
Basic bessemer pig iron	8.88	2 14 0*	6.65	170(1)	7.48	270	16.54	69.50
Furnace coke	1.97	0 12 0	4.85	124	3.05	110	4.57	19.20
Billets	16.45	5 0 0	14.47	370	10.94	395	22.97	96.50
Standard rails	1.21c	8 5 0	1.25c	697	1.50c	1,150	1.37c	127
Merchant bars	.99c	6 15 0	.95c	530	.70c	540	1.19c	110
Structural shapes	1.29c	8 15 0	.99c	550	.65c	500	1.16c	107.50
Plates, †¾-in. or 5 mm	1.32c	9 0 0	1.17c	650	.78c	600	1.37c	127
Sheets, black	1.36c	9 5 0§	1.44c	800‡	.91c	700‡	1.56c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	1.65c	11 5 0	2.83c	1,570	1.87c	1,440	4.00c	370
Plain wire	1.40c	9 10 0	2.03c	1,130	1.69c	1,300	1.92c	178
Bands and strips	1.40c	9 10 0	1.01c	560	.88c	675	1.37c	127

*Basic. †British ship-plates, Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price.
British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel.

STEEL, WROUGHT AND CAST IRON PIPE, AND TUBING

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe □

Base discounts on steel pipe, Pittsburgh and Lorain, O., to consumers in carloads. Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago delivered, 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

Steel In.	Blk.	Gal.	Iron In.	Blk.	Gal.
¼ & ⅜	57	34	½	28	10½
½	62	49½	¾	33	16½
¾	65½	55	1—1¼	36	20½
1—3	67½	57	2	38	21

LAP WELD

2	61	50½	2	26	12½
2½ to 6	64½	54	2½—3½	33	18½
8	62	51	4—6	35	22
10	60	49	7—8	34	21½
12	59	48	9—12	31	16½

BUTT WELD

Extra strong, plain ends

⅛	48	33	¼ & ⅜	+7	+41
¼ & ⅜	53½	38½	½	28	12½
½	59	49½	¾	33	17½
¾	63½	54	1—2	39	23

LAP WELD

Extra strong, plain ends

2	59	49½	2	34	18½
2½ to 4	62½	53	2½—4	39	25
5 & 6	62	52½	4½—6	38	24
8	58	47	7 & 8	36	22
10	51½	40½	9—12	26	13½
12	50½	39½			

STEEL LINE PIPE

2 to 3 butt	66½	2½ to 6 lap	63½
2 lap	60	8 lap	61
10 lap	59	12 lap	58

Discounts on steel pipe are net and not subject to any point or preferential. On iron pipe, the discounts shown on the cards are net, and are not subject to any further discounts or preferentials.

BOILER TUBES

Carload discounts, f.o.b. Pittsburgh

Lap Welded Steel			Charcoal Iron		
2—2¼	38		1¾	8	
2½—2¾	46		2—2¼	13	
3	52		2½—2¾	16	
3¼—3¾	54		3	17	
4	57		3¾—3½	18	
4½—6	46		4	20	
1½	1		4½	21	

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron. Smaller quantities subject to following modifications from base discounts.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Charcoal Iron—under 10,000 pounds, 2 points under base; on 10,000 pounds to carload, base and one 5%.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES COLD DRAWN

1 inch	61		3	46	
1¼—1½	53		3¼—3½	48	
1¾	37		4	51	
2—2¼	32		4½, 5, 6	40	
2½—2¾	40				

HOT ROLLED

2—2¼	38		3¼—3½	54	
2½—2¾	46		4	57	
3	52		4½, 5, 6	48	

Quantity discounts are: Under 10,000 pounds, 10 points and 5 per cent; 10,000 to 24,999 pounds, 6 points and 5 per cent; 25,000 pounds to carload, 2 points and 5 and 5 per cent; carload and over, base discount and 5 and 5 per cent. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Tubing □ □

Cold drawn; f.o.b. mill discounts

Random lengths over 5 ft. 55%
Selected lengths, 1—18 ft. 53%

Cast Iron Water Pipe □ □

Class B Pipe—Per Net Ton

Six-inch and over, Bir. ....$32.00 to 33.00
Four-inch, Birmingham .... 35.00 to 36.00
Four-inch, Chicago ..... 43.40 to 44.40
Six to 24-inch, Chicago..... 40.40 to 41.40
Six-inch and over, N. Y... 32.00 to 34.50
Four-inch, New York ..... 34.50 to 36.50
Stand. fittings, Bir. base.... $90.00

Six to 24-inch, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch plus $20; gas pipe fittings $5 higher. Class A pipe $3 higher than Class B.

Warehouse Quotations at Leading Centers, in Cents Per Pound

(All Philadelphia prices subject to quantity differentials except reinforcing and Swedish bars)

STEEL BARS

Baltimore*	2.35c
Boston††	2.90c
Buffalo	2.95c
Chattanooga..	3.00c
Chicago	2.75c
Cincinnati	3.00c
Cleveland	2.75c
Detroit	2.85c
Houston	2.65c
Los. Ang.	3.30c
New York‡(d)	3.10c
Philadelphia..	2.45c
Pittsburgh	2.60c
Portland	3.35c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.00c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS

Baltimore	2.35c
Boston††	3.10c
Buffalo	3.15c
Chattanooga..	3.00c
Chicago	2.75c
Cincinnati	3.00c
Detroit	2.85c
New York‡(d)	3.10c
Philadelphia..	2.45c
St. Louis	3.00c
Tulsa	3.25c

REINFORC. BARS

Baltimore	2.35c-3.00c
Boston	3.10c-3.25c
Buffalo	2.95c
Chattanooga..	3.00c
Cincinnati	3.00c
Cleveland ..	2.10c-2.25c
Detroit	2.85c
Houston	3.00c
Los. Ang. cl...	2.10c
Los Ang., lcl	2.40c
New York....	2.65c-3.10c
Phila.	2.62½c
Pittsburgh ..	2.60c
San Fran. cl.	2.40c
San Fran. lcl	2.80c
Seattle	3.00c
St Louis	3.15c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore*	2.35c
Boston††	3.00c
Buffalo	3.20c
Chattanooga..	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	3.25c
Los. Ang.	3.30c
New York(d)	3.10c
Philadelphia..	2.45c
Pittsburgh	2.85c
Portland	3.35c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.25c
Tulsa	3.50c

PLATES

Baltimore*	2.35c
Boston††	3.00c
Buffalo	3.20c
Chattanooga..	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland, ¼-in. and thicker	2.95c
Clev., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles..	3.30c
New York(d)	3.30c
Philadelphia..	2.45c
Phila. floor....	5.10c
Pittsburgh	2.85c
Portland	3.35c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE

Baltimore*	2.80c
Boston††	2.90c-3.00c
Buffalo	3.45c
Chattanooga..	3.50c
Chicago	2.75c-2.90c
Cincinnati	3.30c
Cleveland	3.00c
Detroit	2.90c-3.05c
Houston	3.35c
Los Ang.	3.60c
N. Y.	3.00c
Portland	4.00c
Phila.*† (e)....	2.90c
Pitts.**	3.00c
San Fran.	3.50c
Seattle	4.00c
St. Louis	3.00c-3.15c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK

Balt.*†	3.50c
Boston††	3.85c
Buffalo	3.70c
Chattanooga..	3.65c
Chicago	3.45c
Cincinnati	3.75c
Cleveland	3.25c
Detroit	3.50c
Los Ang.	4.20c
New York ..	3.75c-4.00c
Phila.*†(e) ..	3.40c
Pitts.**	3.40c
Portland	4.50c
San Fran.	3.90c
Seattle	4.50c
St. Louis	3.70c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS

Balt.*†	4.00c
Boston††	4.00c
Buffalo	4.05c
Chattanooga..	3.95c
Chicago 3.50c-3.75c	

††Base 15,000 lbs., extras on less.

Cincinnati	4.25c
Cleveland	3.75c
Detroit	3.75c
Houston	4.25c
Los. Ang.	4.50c
New York....4.00c-4.10c	
Phila.*†(e)	3.75c
Pitts.**	3.90c
Portland	5.00c
San. Fran.	4.55c
Seattle	5.00c
St. Louis	4.00c
St. Paul	4.19c
Tulsa	5.10c

†BANDS

Baltimore	2.65c
Boston††	3.40c
Buffalo	3.30c
Chattanooga..	3.20c
Chicago	2.95c
Cincinnati	3.20c
Cleveland	3.00c
Det. 3/16-in. & lighter....	3.15c
Houston	3.65c
Los Ang.	3.80c
New York(d)	3.30c
Philadelphia..	2.75c
Pittsburgh	2.95c
Portland	3.85c
San Fran.	3.15c
Seattle	3.50c
St. Paul	3.20c
Tulsa	3.45c

†HOOPS

Baltimore	2.65c
Boston	4.90c
Buffalo	3.95c
Chicago	3.50c
Cincinnati	3.75c
Det. No. 14 & lighter....	3.30c
New York	3.30c
Philadelphia..	3.00c
Pittsburgh	3.60c
Seattle	5.00c
St. Paul	3.75c

†New extras apply.

COLD FIN. STEEL

Rounds & Hexagons

Baltimore (c)*	3.48c
Boston	3.60c
Buffalo	3.00c
Chattanooga*	3.65c
Chicago	3.00c
Cincinnati	3.32c
Cleveland	2.95c
Detroit	3.15c
Los Ang. (a)	4.25c
New York	3.39c
Philadelphia*	3.35c
Pittsburgh	2.95c
Portland (a)	4.50c
San Fran. (d)(f)	5.55c
Seattle (a)....	4.50c
St. Paul (a)..	3.20c
St. Louis	3.36c
Tulsa	4.65c

Flats and squares 50c extra, except Tulsa, where 5.14c is quoted.

COLD ROLL. STRIP

Boston 0.100 in., 500 lb. lots	5.20c
Buffalo	5.25c
Chicago (b)...	5.65c
Cincinnati	5.80c
Cleve. (b)	5.55*
Detroit	5.40c
Phila. (c).....	4.55c
New York	4.55c

(a) Rounds, hex, only.
(b) Net base straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
(e) New mill classif.
(f) Rounds only.
‡Domestic bars.
*Plus quan. extras.
**Less than 25 sheets
*†50 or more bundles

Here and There In Industry

(*Concluded from Page 17*)

Shannon's associates are W. L. Richardson, structural engineer; W. K. Sanders, mechanical engineer; O. P. Stein, structural engineering assistant; and O. A. Demuth, electrical engineer.

□ □ □

Marks Perry Steel Corp., 300 South Artillery avenue, Detroit, has moved its offices and warehouse to 10425 Northlawn avenue, on the Union Belt railway. The company specializes in sheet and strip steel, cut to size.

□ □ □

Covert Gear & Mfg. Co., Lockport, N. Y., under receivership with A. W. Glostzner and W. W. Campbell as receivers, has been authorized to continue for 90 days under the receivers. The plant is operating near capacity.

□ □ □

Gould's Pumps Inc., Seneca Falls, N. Y., has bought the Hydroil Corp., Lebanon, Ind., manufacturer of oil purifying equipment. The plant at Lebanon is being discontinued and the business and manufacturing equipment transferred to Seneca Falls, where production will be resumed Jan. 1.

□ □ □

Badger Mfg. Co., Milwaukee, manufacturer of automobile bumpers, has decided to go out of business rather than use its cash resources in profitless operation. Its fixed assets have been sold at auction, more than $250,000 worth of presses and other machine tools being disposed of. The company was formed in 1918 as successor to the Auto Parts Mfg. Co., which had been formed in 1910. Charles H. Hathaway is president, John T. Johnson vice president, and Walter V. Isgrig secretary-treasurer.

□ □ □

Lake City Malleable Foundry Co., Cleveland, is maintaining an instructive display in the Hanna building, Cleveland, showing the evolution of a malleable casting from raw material to finished product. Pairs of castings illustrate improvement in design from original pattern, giving lessened weight, better appearance and greater uniformity of metal thickness. Other exhibits demonstrate corrosion resistance of malleable iron. The display includes samples of metals, fuel, sand; patterns and coreboxes; obsolete and improved pattern mounting; annealing and packing methods, testing equipment; chart showing quantity of material handled per ton of castings; examples of changed design; variety of devices wholly or partly of malleable iron; common defects and prevention methods; test bars and records; bent and hammered castings showing malleability; methods of applying gates and risers for best results.

□ □ □

Roots - Connersville - Wilbraham, Connersville, Ind., manufacturer of blowers, pumps and meters, reports the largest volume of unfilled orders since March. Orders booked in November exceeded the same month in 1931, this being the second comparative monthly gain for the current fiscal year over last.

□ □ □

Bryant Engineering & Machinery Co., 400 West Madison street, Chicago, has appointed the General Machinery Corp., 140 Federal street, Boston, its exclusive dealer in Boston territory for Dreses radial drills, Ohio shapers and planers, Boye & Emmes engine lathes, Ohio horizontal boring, drilling and milling machines, Cleereman drills, Kling heavy duty grinders and Imperial arc welders.

□ □ □

William B. Scaife & Sons Co., Oakmont, Pa., has opened a sales and engineering office at 42 East avenue, Rochester, N. Y., in charge of F. H. Wisewell, formerly with the United States Gypsum Co. The Scaife line of water softeners, filters and purification equipment will be represented.

Carbon and Alloy Steels
Blue Annealed Sheets,
Sheared Plates: also Billets.

Rolled Steel Floor Plates
Diamond, Diamondette and Ribbed Patterns

Swede Pig Iron
Rainey-Wood Coke

ALAN WOOD STEEL CO.
ESTABLISHED
"A.W." TRADE MARK
1826
CONSHOHOCKEN, PA.

ALAN WOOD STEEL CO.
CONSHOHOCKEN, PA.

Branch Offices:

Philadelphia — New York — Los Angeles
Seattle — San Francisco — Houston

LARGEST BUILDERS OF THE WORLD'S LARGEST CRANES

Alliance Products

STANDARD CRANES
Up to 430 tons capacity

STRIPPING CRANES
Up to 320 tons capacity

COMBINATION CHARGERS and STRIPPERS
Up to 200 tons capacity

—+—

Ladle Cranes
Ingot Strippers
Soaking Pit Cranes
Open Hearth Charging Machines
Slab and Billet Charging and Drawing Machines
Gantry Cranes
Ore and Coal Bridges
Car Dumpers
Forging Manipulators
Steam Drop Forge Hammers
Coke Pushers, Levelers and Door Lifters
Coal Pier Equipment
Rolling Mill Machinery
Cement Plant Machinery
Dock Handling Equipment
Coke Oven Equipment

275 of 100 Tons Capacity and over

LADLE AND STANDARD CRANES

59	100 tons
2	WORM DRIVEN Ladle, 100 tons
2	115 tons
6	WORM DRIVEN Ladle, 125 tons
45	125 tons
30	150 tons
3	WORM DRIVEN Ladle, 150 tons
6	WORM DRIVEN Ladle, 160 tons
2	WORM DRIVEN Ladle, 165 tons
7	WORM DRIVEN Ladle, 175 tons
27	175 tons
3	WORM DRIVEN Ladle, 200 tons
4	200 tons
5	225 tons
1	250 tons
3	WORM DRIVEN Ladle, 250 tons
3	WORM DRIVEN Ladle, 275 tons
1	275 tons
1	300 tons
3	430 tons

STRIPPING CRANES

8	100 tons
1	125 tons
22	150 tons
19	200 tons
1	Single Ram, 320 tons

COMBINATION CHARGERS AND STRIPPERS

3	100 tons
1	125 tons
3	150 tons
4	200 tons

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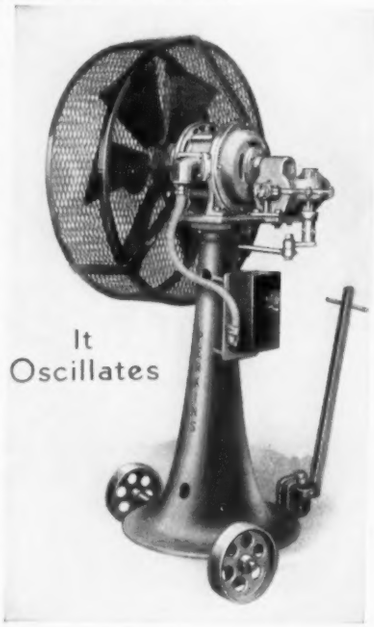

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Engineers and Manufacturers Holyoke, Mass.

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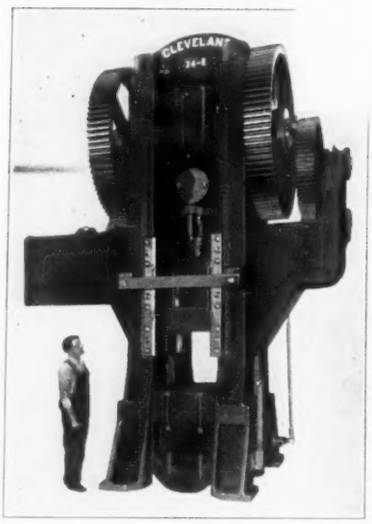

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Cleveland, O.

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Construction and Enterprise

CONCISE, TIMELY BUSINESS BUILDING OPPORTUNITIES IN FIELD OF INDUSTRY

New England

SOUND BEACH, CONN.—A building formerly occupied by the Welte Tripp Co. has been bought by Electrolux Inc., which will equip the plant for the manufacture of electrical cleaners. The plant contains 53,000 square feet of floor space and is in a plot of seven acres on the New York, New Haven & Hartford railroad. Joseph P. Day, Sound Beach and Stamford, Conn., was in charge of the sale.

SPRINGFIELD, MASS.—Gilbert & Parker Mfg. Co., West Springfield, has reopened its foundry, idle for several months. Its product includes gasoline pumps, range burners and oil burners. Present orders insure activity well into 1933.

New York

LOCKPORT, N. Y.—George C. Lewis has been elected trustee of the Multicell Radiator Co., Lockport, and has been authorized to sell its assets in the federal building in that city.

NEW YORK—J. W. Sullivan, 827 East Ninth street, is making alterations to his machine shop to cost $28,000, including additional equipment.

NIAGARA FALLS, N. Y.—Isco Chemical Co., Niagara Falls and 117 Liberty street, New York, plans a boiler house and plant addition here.

OSWEGO, N. Y.—Part of the Savage Arms Corp. plant is to be used by the Universal Pressing Machine Co. Inc., moving here from Utica, N. Y. Its products will be sold by the sales force of the Savage company as part of its line.

SYRACUSE, N. Y.—Syracuse Chilled Die & Casting Co., Syracuse, suffered loss of its office building by fire recently. The main plant was little damaged.

WORTH, N. Y.—Lorraine Electric Co., Lorraine, N. Y., plans an electric light and power plant and distributing system in Jefferson county, to cost about $25,000.

New Jersey

NEWARK, N. J.—Fogwal Metal & Trading Co. has been incorporated with $125,000 capital to produce metals, by Philip Lowits, 810 Broad street, Newark, N. J.

NEWARK, N. J.—Lincoln Metal Products Corp. has been incorporated with 2500 shares no par value to manufacture patented metal products, by Harry Kaiser, 45 Brandford place, Newark, N. J.

PASSAIC, N. J.—Overman Metal Co. has been incorporated with 1000 shares no par value to conduct a scrap iron and steel business, by Bernard Feinberg, 545 Broadway, Passaic, N. J.

WEST NEW YORK, N. J.—Century Lighting Fixture Co. has been incorporated with 1000 shares no par value to manufacture lighting fixtures and similar products, by Otto Cooper, 625 Bline avenue, West New York, N. J.

Pennsylvania

SLATINGTON, PA.—Harry E. Orkin Co. has been incorporated with $5000 capital to deal in iron, steel and metal products, by Ethel Orkin, 301 Chestnut street, Slatington, Pa.

Ohio

CLEVELAND—Park Metal Reduction Co. has been incorporated with $25,000 capital by John Rutkowski, 5208 Harvard avenue, Cleveland, and associates.

COLUMBUS, O.—Atlas Brass Co. suffered a severe loss by fire, its foundry building being destroyed with loss of about $10,000.

PORTSMOUTH, O.—Breece Mfg. Co. is seeking permission from United States engineers at Pittsburgh to make a fill on the right bank of the Ohio river at its plant at New Boston, O.

STOW, O.—Village of Stow plans wells, a pumping station and watermains, to cost $100,000. E. D. Barstow, Akron, O., is engineer.

Michigan

DETROIT—Plans are being made by Joseph S. Stringham, city engineer, for a pumping station to cost $22,000.

DETROIT—Marvel Coach Manufacturers Inc., 19034 Celestine avenue, has been incorporated with $9000 capital to manufacture automobile trailers, by Hugh L. McKenney, 320 East Grand boulevard, Detroit.

GRAND RAPIDS, MICH.—H. W. Walstrom, commissioner, has recommended to the Grand Rapids city commission the advisability of constructing a plant to utilize waste gas at the municipal sewage treatment works.

LANSING, MICH.—Kold-Hold Mfg. Co. has been incorporated with 1000 shares no par value and $50,000 preferred stock to manufacture refrigerating devices, by Ransom E. Olds, Lansing, Mich.

MUSKEGON, MICH.—Norge Corp. has given a general contract to Muskegon Construction Co. for alterations to its plant here.

Indiana

AURORA, IND.—Martin Bros. Barrel, Box & Lumber Co. is seeking permission from United States engineers at Pittsburgh to construct an overhead monorail tramway near Aurora, consisting of five structural steel columns and a trolley carrier on a monorail beam to transfer freight to and from barges on the river.

FORT WAYNE, IND.—Patterson Engineering Co., Detroit, is low bidder on the Anthony dam and pumping station at Fort Wayne, at $298,980.

SHELBYVILLE, IND.—Great States Corp., manufacturer of hand and power lawnmowers, has started production in a plant to which it recently moved part of its equipment from Richmond, Ind. T. P. Nickell is president.

Illinois

CHICAGO—Central Die Casting & Mfg. Co. Inc., 2935 West Forty-seventh street, has been incorporated with 600 shares no par value to manufacture products of iron, steel nickel and other metals, by James M. Hopkins Jr. and associates. Winston, Strawn & Shaw, First National Bank building, are correspondents.

Southern States

ANNISTON, ALA.—Emery Pipe & Foundry Co. Inc. has applied to the city council of Anniston for 5-year exemption from taxes on its plant, which will be constructed immediately. The company succeeds the Emery Foundry Co., whose plant was destroyed by fire in June. The company is capitalized at $80,000.

GOODWATER, ALA.—O. R. Rudisail and associates, Greenville, S. C., have plans for developing a tract of 1000 acres for a tin mine near here in Coosa county, to cost $5,000,000.

WILMINGTON, DEL.—Consolidated Machine Tool Co. plans alterations and rebuilding after fire, including replacement of equipment, about $28,000.

WASHINGTON—Bureau of supplies and accounts, navy department, will open bids Dec. 20, as follows: Schedule 9244, one motor-driven bar and chucking universal turret lathe, for Portsmouth, N. H. delivery; schedule 9245, one motor-driven drill and tapper, for Portsmouth, N. H.; Jan. 4, schedule 9219, one motor-driven circular saw grinding machine, for Mare Island, Calif.; schedule 9240, one motor-driven rotary shear; schedule 9241, one motor-driven cut-off saw; schedule 9242, one motor-driven horizontal bending roll machine; one motor-driven turret lathe, complete with equipment, for Puget Sound, Wash.; schedule 9302, one crane truck, for San Diego, Calif.

MACON, GA.—City council has a survey and estimate of cost of a municipal electric light and power plant. Burns & McDonnell, Interstate building, Kansas City, Mo., are engineers.

PHILADELPHIA, MISS. — Natural

WHERE-TO-BUY

A classified list of advertisers according to products. ¶Index to advertisements gives page number of any advertiser.

ABRASIVES (Polishing)
Carborundum Co., Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

ACCUMULATORS
Logemann Brothers Co., 3126 Burleigh St., Milwaukee.

ACETYLENE
Linde Air Products Co., 30 E. 42nd St., New York City.

ACIDS (Pickling)
American Chemical Paint Co., Ambler, Pa.

AIR COMPRESSORS—See COMPRESSORS (Air)

ALLOYS—See FERROALLOYS

ANGLES, CHANNELS—See STEEL (Structural)

ARBORS
Morse Twist Drill & Machine Co., New Bedford, Mass.

AXLES
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.

BABBITT METAL
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.

BALING PRESSES
Logemann Brothers Co., 3126 Burleigh St., Milwaukee.

BANDS (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Corrigan, McKinney Steel Co. 3100 E. 45th St., Cleveland, O.

BANDS AND HOOPS (Galvanized Strips)
Sharon Steel Hoop Co., Sharon, Pa.

BAR BENDERS
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.

BARGES (Steel)
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
McClintic-Marshall Corp., Bethlehem, Pa.

BARS (Alloy)
Bethlehem Steel Co., Bethlehem, Pa.
Crucible Steel Co. of America, 17 E. 42d St., New York City
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Republic Steel Corp., Youngstown, O.

BARS (Concrete Reinforcing)
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.

BARS (Iron)—See IRON (Bar)

BARS (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Corrigan, McKinney Steel Co. 3100 E. 45th St., Cleveland, O.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

BEAMS, CHANNELS, ANGLES, ETC.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Weirton Steel Co., Weirton, W. Va.

BEARINGS (Ball)
Bantam Ball Bearing Co., The, South Bend, Ind.

BEARINGS (Journal)
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Roller)
Bantam Ball Bearing Co., The, South Bend, Ind.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Thrust)
Timken Roller Bearing Co., The, Canton, O.

BENDING AND STRAIGHTENING MACHINES
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland, O.
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.
Logemann Bros. Co., 3126 Burleigh St., Milwaukee.
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

BENZOL AND TOLUOL RECOVERY PLANTS
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh.

BILLETS (Alloy and Carbon Steel)
Alan Wood Steel Co., Conshohocken, Pa.
Republic Steel Corp., Youngstown, O.
Washburn Wire Co., Phillipsdale, R. I.

BILLETS (Forging)
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.

BILLETS AND BLOOMS
Alan Wood Steel Co., Conshohocken, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Corrigan, McKinney Steel Co. 3100 E. 45th St., Cleveland, O.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.

BLAST FURNACE SPECIALTIES
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh, Pa.

BLAST FURNACES—See FURNACES (Blast)

BLOWERS
General Electric Co., Schenectady, N. Y.
Coppus Engineering Corp., 359 Park Ave., Worcester, Mass.

BOILER HEADS
Bethlehem Steel Co., Bethlehem, Pa.

BOILER TUBES—See TUBES (Boiler)

BOLTS
Bethlehem Steel Co., Bethlehem, Pa.
Clark Bros. Bolt Co., Ridge Rd., Milldale, Conn.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.

BRAKES (Electric)
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland, O.

BRICK (Fire Clay)
Eureka Fire Brick Works, 1015 House Bldg., Pittsburgh, Pa.

BRICK (Insulating)—See INSULATING BRICK

BRICK (Silicon Carbide)
Carborundum Co., Perth Amboy, N. J.
Norton Co., Worcester, Mass.

BRIDGE CRANES (Ore and Coal Handling)
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BRIDGES, BUILDINGS, VIADUCTS, STACKS
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Belmont Iron Works, 22nd & Washington Ave., Philadelphia, Pa.
McClintic-Marshall Corp., Bethlehem, Pa.
Truscon Steel Co., Youngstown, O.

BUCKETS (Clam Shell, Dragline, Grab, Single Line)
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

BUILDINGS (Steel)—See BRIDGES, ETC.

BULLDOZERS
Logemann Bros. Co., 3126 Burleigh St., Milwaukee.

BURNERS (Acetylene)—See TORCHES & BURNERS

BURNERS (Automatic)
American Heat Economy Bureau Inc., Wabash Bldg., Pittsburgh, Pa.
Ohio Valley Clay Co., Steubenville, Ohio.

BURNERS (Fuel, Oil, Gas, Combination)
Ohio Valley Clay Co., Steubenville, Ohio.

BURNERS (Luminous Flame)
Ohio Valley Clay Co., Steubenville, Ohio.

BY-PRODUCT PLANTS
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh, Pa.

CAP SCREWS—See SCREWS (Cap, Set, Safety)

CARBIDE
Linde Air Products Co., 30 E. 42nd St., New York City

CAR DUMPERS
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

CARS (Industrial and Mining)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland.
Bethlehem Steel Co., Bethlehem, Pa.

CASTINGS (Acid Resisting)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
International Nickel Co., 67 Wall St., New York City.

CASTINGS (Alloy Steel)
American Steel Foundries, 410 No. Michigan Ave., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.

CASTINGS (Brass, Bronze, Copper, Aluminum)
Bethlehem Steel Co., Bethlehem, Pa.
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.

CASTINGS (Electric Steel)
Pittsburgh Electric Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
West Steel Casting Co., 805 E. 70th St., Cleveland, O.

CASTINGS (Gray Iron)
Bethlehem Steel Co., Bethlehem, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Roll & Foundry Co., The, Avonmore, Pa.

CASTINGS (Heat Resisting)
Driver-Harris Co., Harrison, N. J.

CASTINGS (Malleable)
Peoria Malleable Castings Co., Peoria, Ill.

CASTINGS (Manganese Steel)
Commercial Steel Casting Co., Marion, Ohio.

Gas Co., Jackson, Miss., has been granted permission to build a pipeline from the Jackson field to this city.

WHEELING, W. VA.—Wheeling Coal Co. has asked permission from United States engineers at Pittsburgh to install pile clusters and a belt conveyor on the Ohio river in the Richland, W. Va., district.

Missouri

KANSAS CITY, MO.—Benson Brass & Chandelier Works, which lost its plant by fire several months ago and has been occupying temporary quarters, has bought the 2-story plant at Eighteenth street and Agnes avenue. This will be remodeled and equipped for production at once. It contains about 50 per cent more space than the former plant.

Texas

DALLAS, TEX. — Vulcan Bearing Service has been incorporated with $6000 capital, by J. E. Kegerreis, 2312 Main street.

DALLAS, TEX.—H. L. Battle Machine Works, specializing in general jobbing and contract work, has moved its office and shops to 2642 Main street. H. L. Battle is owner.

HOUSTON, TEX.—Garrett Engineering Co. has been incorporated to work in metal architecture, by M. T. Garrett, president.

LONGVIEW, TEX.—Wheatley Bros. Foundry & Machine Works, Tulsa, Okla., has established a branch machine works and office here to serve the East Texas oil fields. Thomas Wheatley, Tulsa, Okla., is general manager.

SAN ANTONIO, TEX.—Hampton Core Barrel & Supply Co. has been incorporated with $1000 capital to manufacture oil field equipment. W. H. Ellis Jr. is president.

Wisconsin

MILWAUKEE—Harnischfeger Sales Corp. has taken a contract from the bureau of yards and docks, navy department, for a 10-ton electric traveling bridge crane for the navy yard at Cavite, P. I., at $5955.

Minnesota

MINNEAPOLIS, MINN. — Minnesota Mining & Mfg. Co., Forest and Fauquier streets, has awarded a contract to W. N. Murphy & Son, Pioneer building, for a plant addition to cost $40,000. (Noted Nov. 28).

Colorado

COLORADO SPRINGS, COLO.—The city has budgeted $27,000 for waterworks replacements and extensions in 1933 and $40,000 for improvements to the gas system.

DENVER—Utah Vanadium Corp., formed in 1928 has found sufficient ore in its holdings southwest of Green River, Utah, in the Henry mountains, to justify erection of a mill. The first unit will have capacity for 25 tons daily. John E. Daley is field superintendent. An office will be opened in Denver in charge of Ray B. Edson, secretary-treasurer. R. J. Evans, Salt Lake City, Utah, is president.

DENVER—Bids will be taken Dec. 20 by the bureau of reclamation, Denver, for a 40-ton single motor crane with span of 40 feet, five inches and a hook lift of 22 feet; 20-ton single motor crane of 31 feet, 4½ inches span and hook lift of 150 feet; two 5-ton single motor cranes of 15 feet, four inches span with hook lift of 55 feet; one 5-ton single motor crane of 11 feet 10½ inches span and hook lift of 87 feet.

Montana

DEER LODGE, MONT.—Lease & LeGrande, Great Falls, Mont., have the general contract for a water system here, including reinforced concrete pump house and 1000 tons of cast iron pipe.

Nevada

LAS VEGAS, NEV.—Bids will be received until Feb. 3 by the bureau of reclamation, Denver, Colo., for three to five 115,000-horsepower and one to two 55,000-horsepower vertical shaft hydraulic turbines, with governors, with or without butterfly-type shutoff valves, for installation at Hoover dam.

Arizona

PHOENIX, ARIZ.—Consolidated Steel Pipe & Tank Co., Franklin Hageman president, Alfred Johnson vice president and manager, will start operations March 1. The first building will be 80 x 100 feet, equipped with overhead traveling crane, and will cost $65,000, including equipment.

Pacific Coast

CRESCENT CITY, CALIF.—The city is making a survey of electric power and waterworks service operated as municipal public utilities.

LOS ANGELES—Metalite Mfg. Co. spinner and manufacturer of metal stampings, tools and dies, has occupied larger quarters at 1116 West Washington boulevard where increased facilities are available.

LOS ANGELES—Summerbell Roof Structures, 754 East Twenty-ninth street, is the name adopted by the amalgamation of the Summerbell Truss Co. and the Trussless Roof Co. of California. Offices have been established at Seattle, Portland, Oreg., Oakland, Calif., San Diego, Calif., and Phoenix, Ariz.

SAN FRANCISCO — George W. Kneass Co., Eighteenth and Illinois streets, George Kneass manager, will rebuild at once its boat-building plant, recently destroyed by fire. The yard is reported to have taken a contract for thirty 29-foot gillnet boats for the Alaska Packers Association, San Francisco.

PORTLAND, OREG.—LaDee Logging Co., 1304 American Bank building, wants prices and descriptions of motor dump trucks, shovels, cranes and pile drivers.

BREMERTON, WASH.—Supply officer of the navy yard will take bids soon on a caterpillar tractor for Puget Sound navy yard, to cost about $2500.

PUGET SOUND NAVY YARD, WASH.—Bids will be opened Dec. 20 for furnishing a motor-driven extra heavy edge plate planer, boiler tubes, boring mills and bronze valves.

SEATTLE—Shell Oil Co. has budgeted $1,000,000 for improvements and extensions to its facilities in Washington and British Columbia during the next few months. A refinery is being built at Vancouver, B. C., and an additional storage tank is being installed here.

SPOKANE, WASH.—Spokane Gas & Fuel Co., James L. Stone, vice president and general manager, is considering plans for connecting this city and environs with the gas fields in northern Montana, requiring a pipe line 300 miles long. Estimates of the cost are about $12,000,000.

Dominion of Canada

VANCOUVER, B. C.—Canadian National Railways, industrial department, announces that Pacific Mills Ltd., subsidiary of Crown-Zellerbach Corp., will extend its plants here and at Ocean Falls, B. C., to manufacture fiber containers, at a cost of about $350,000.

TRENTON, N. S.—Canadian National Railways has placed an order with the Eastern Car Co. for 500 all-steel gondolas of 70 tons capacity, a type not previously built in Canada.

BOBCAYGEON, ONT.—A by-law will be submitted this winter for the purchase of two turbines and generators, to cost about $10,000. George B. Moore is village clerk.

HAMILTON, ONT.—Wilkinson & Kompass Wholesale Hardware Co. suffered loss of about $200,000 by fire in its 4-story plant here.

TORONTO, ONT.—Arrow Cable & Fittings has been incorporated with $40,000 capital to manufacture cables, conduits and electrical fittings, by Arthur L. Wynston Jr., Toronto.

TORONTO, ONT.—Willard Storage Battery Co. has asked a permit to build a plant costing $10,000 at 269 Campbell avenue.

TORONTO, ONT.—Marine Equipment Co. Ltd., has been incorporated with $100,000 capital to manufacture windlasses, capstans, boilers and engines, by Lee G. Yatchford, Toronto.

MONTREAL, QUE.—Bids will be received until Dec. 21 for furnishing and constructing an emergency intake conduit system and installing chlorine equipment in connection with the waterworks system.

WHERE-TO-BUY

CASTINGS (Steel)
Allegheny Steel Co., Brackenridge, Pa.
American Steel Foundries, 410 No. Michigan Ave., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Mach. Co., Birdsboro, Pa.
Commercial Steel Casting Co., Marion, Ohio.
Mackintosh-Hemphill Co., Penn Ave. at Water St., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Roll & Foundry Co., The, Avonmore, Pa.
West Steel Casting Co., 805 E. 70th St., Cleveland.

CASTINGS (Worm & Gear Bronze)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.

CASTORS (Plate Mills)—See PLATE CASTORS

CEMENT (High Temperature)
Carborundum Co., Perth Amboy, N. J.

CHROME ORE
Samuel Frank, & Co., Inc., Harrison Bldg., Philadelphia.

CHROMIUM METAL
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

CLEANING SPECIALTIES
American Chemical Paint Co., Ambler, Pa.

COAL AND COKE
Alan Wood Steel Co., Conshohocken, Pa.
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Hanna Furnace Corp., The, Buffalo, N. Y.
Interlake Iron Corp., Union Trust Bldg., Cleveland, O.
Oglebay, Norton & Co., Hanna Bldg., Cleveland, O.
Pickands, Mather & Co., Union Trust Bldg., Cleveland, O.
Shenango Furnace Co., Oliver Bldg., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

COKE—See COAL AND COKE

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

COKE OVENS (By-Product)
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh.

COMPENSATORS (Automatic)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

COMPRESSORS (Air)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Curtis Pneumatic Machinery Co., 1996 Kienlen Ave., St. Louis, Mo.
General Electric Co., Schenectady, N. Y.

CONCRETE REINFORCING BARS —See BARS (Concrete Reinforcing)

CONDENSERS (Surface, Barometric, Multi-Jet)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

CONDUITS (Electric)
Youngstown Sheet & Tube Co., Youngstown, O.

CONTRACTORS—See ENGINEERS AND CONTRACTORS

CONTROLLERS (Electric)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

CONVEYOR BELTS (High & Low Temperature)
Wickwire Spencer Steel Co., 41 E. 42nd St., New York City.

COOLING EQUIPMENT
Coppus Engineering Corp., 359 Park Ave., Worcester, Mass.

COTTER PINS
Hindley Mfg. Co., Valley Falls, R. I.

COUPLINGS (Flexible)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

CRANES (Charging)
Alliance Machine Co., The, Alliance, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Morgan Engineering Co., Alliance, O.

CRANES (Creeper, Erection)
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.

CRANES (Electric)
Alliance Machine Co., The, Alliance, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee, Wis.
Morgan Engineering Co., Alliance, O.

CUTTING AND WELDING—See WELDING

CUTTING OILS
Sun Oil Co., 1608 Walnut St., Philadelphia, Pa.

CYLINDERS (Pressure)
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Scaife, Wm. B., & Sons Co., Oakmont, Pa.

DEOXIDIZERS
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 120 Broadway, New York City.

DIE BLOCKS
Bethlehem Steel Co., Bethlehem, Pa.
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.

DOORS AND SHUTTERS (Steel, Fire and Rolling)
Truscon Steel Co., Pressed Steel Div., Youngstown, O.

DRILLING MACHINES (Multiple, Heavy Duty)
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

DRILLING MACHINES (Radial)
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

DRILLS (Twist)—See TWIST DRILLS

DRIVES (Cut Herringbone Gears)
Farrel-Birmingham Co., Inc., 322 Vulcan St., Buffalo, N. Y.
Lewis Foundry & Machine Co., P. O. Box 1591, Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.

DRIVES (Multi V-Belt)
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

DUST ARRESTOR EQUIPMENT
American Foundry Equipment Co., Mishawaka, Ind.

ELECTRICAL EQUIPMENT
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.
General Electric Co., Schenectady, N. Y.

ELECTRIC HEATING ELEMENTS
Globar Corp., Niagara Falls, N. Y.

ELECTRIC WELDING (See Welding)

ENGINEERS AND CONTRACTORS
Laughlin, Alex, & Co., First National Bk. Bldg., Pittsburgh, Pa.
Wean Engineering Co., Warren, Ohio.
Wellman Engineering Co., 7000 Central Ave., Cleveland, O.

ENGINEERS (Consulting)
Freyn Engineering Co., 310 S. Michigan Ave., Chicago, Ill.
Perin Engineering Co., Inc., 11 West 42nd St., New York City.

ENGINEERS, CONSULTING (By-Product Coke Oven & Gas Plants)
Koppers Construction Co., 1301 Koppers Bldg., Pittsburgh.

FACING MACHINES (Structural)
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

FANS (Portable)
Coppus Engineering Corp., 359 Park Ave., Worcester, Mass.
Perkins, B. F., & Son, Inc. Holyoke, Mass.

FERROALLOYS
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
International Nickel Co., 67 Wall St., New York City.
Oglebay, Norton & Co., Hanna Bldg., Cleveland, O.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 120 Broadway, New York City.

FERROCARBON (Titanium)
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

FERROCHROME
Oglebay, Norton & Co., Hanna Bldg., Cleveland, O.
Vanadium Corp. of America, 120 Broadway, New York City.

FERROMANGANESE
Oglebay, Norton & Co., Hanna Bldg., Cleveland, O.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia, Pa.

FERROPHOSPHORUS
Oglebay, Norton & Co., Hanna Bldg., Cleveland, O.

FERROSILICON
Oglebay, Norton & Co., Hanna Bldg., Cleveland, O.
Vanadium Corp. of America, 120 Broadway, New York City.

FERROSILICON (Aluminum)
Vanadium Corp. of America, 120 Broadway, New York City.

FERROTUNGSTEN
Electro Metallurgical Sales Corp., 30 East 42nd St., New York City.
Vanadium Corp. of America, 120 Broadway, New York City.

FERROVANADIUM
Vanadium Corp. of America, 120 Broadway, New York City.

FLASKS (Foundry)
Truscon Steel Co., Youngstown, O.

FLOORING (Steel)
Alan Wood Steel Co., Conshohocken, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.

FLOORS
Union Products Co., 1252 W. 70th St., Cleveland, O.

FLUORSPAR
Oglebay, Norton & Co., Hanna Bldg., Cleveland, O.

FORGING BILLETS—See BILLETS (Forging)

FORGING MACHINERY
Cleveland Punch & Shear Wks. Co., 3917 St. Clair Ave., Cleveland, O.

FORGING (Brass, Bronze, Copper)
Revere Copper & Brass, Inc., 230 Park Ave., New York City.

FORGINGS (Drop)
Bethlehem Steel Co., Bethlehem, Pa.
Fruin Drop Forge Co., 341-355 W. Root St., Chicago.

FORGINGS (Iron and Steel)
Heppenstall Co., 47th and Hatfield Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.

FORGINGS (Upset)
Bethlehem Steel Co., Bethlehem, Pa.

FROGS AND SWITCHES
Bethlehem Steel Co., Bethlehem, Pa.

FURNACE CONTROLS (Open Hearth)
Morgan Construction Co., Worcester, Mass.

FURNACE INSULATION—See INSULATION

FURNACES (Blast)
Freyn Engineering Co., 310 S. Michigan Ave., Chicago, Ill.
McClintic-Marshall Corp., Bethlehem, Pa.

FURNACES (Electric Heating)
Electric Furnace Co., The, Wilson St., Salem, O.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.
Strong, Carlisle & Hammond Co., 1392 W. 3rd St., Cleveland, O.

FURNACES (Electric Melting)
Ajax Electrothermic Corp., Trenton, N. J.
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
General Electric Co., Schenectady, N. Y.
Pittsburgh Electric Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.

FURNACES (Forging)
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.

FURNACES (Open-Hearth)
Criswell, James, Co., Keenan Bldg., Pittsburgh.
Laughlin, Alex, & Co., First National Bk. Bldg., Pittsburgh, Pa.

FURNACES (Recuperative)
Electric Furnace Co., The, Wilson St., Salem, O.

FURNACES (Sheet and Tin Mill)
Wean Engineering Co., Warren, Ohio.

FURNACES (Steel Mill)
Electric Furnace Co., The, Wilson St., Salem, O.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.
Morgan Construction Co., Worcester, Mass.

FURNACES (Steel Treating, Annealing & Case Hardening)
Carborundum Co., Perth Amboy, N. J.
Electric Furnace Co., The, Wilson St., Salem, O.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., 6545 Epworth Blvd., Detroit, Mich.
Strong, Carlisle & Hammond Co., 1392 W. 3rd St., Cleveland, O.

GALVANIZING PLANTS FOR SHEETS
Wean Engineering Co., Warren, Ohio.